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Established 1914

CHEMICAL INDUSTRIES

Vol. 40 April 1937 No. 4

Published monthly and entered as 2d class matter Dec. 22, 1934, at the Post Office at New Haven, Conn., under the Act of March 3, 1879. Subscription, domestic and Canada, $3 a year; foreign, $4.


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# *It's* PRECIOUS LIQUOR *to Jim Lester*

•

THERE'S more to Jim Lester's job in Mathieson's plant at Saltville, Virginia, than just filling liquid caustic tank cars. His is the task not only to see that cars are properly filled, but to make sure that each car interior is clean and free from defects before filling, that pipe lines, valves, pumps are all in perfect condition. On him rests a goodly share of the responsibility for the uniform purity of Mathieson Liquid Caustic when it arrives at your plant.

One reason Jim Lester carries this responsibility so well is his frank respect for the quality of Mathieson Caustic. Throughout the eleven years he has worked at Saltville, this man has watched his company steadily improve its processes, has seen it lead time and again in producing caustic which set new standards for purity and uniformity. With such a background, it is no wonder Jim Lester regards the product in his care as "precious liquor"—no wonder that, like all of the men behind Mathieson Chemicals, he spares no pains to deliver you a dependable product of uniform, outstanding purity.

*The* MATHIESON ALKALI WORKS *(Inc.)*
60 East 42nd Street New York, N. Y.

*Send for free 72-page book, "Cutting Costs with Liquid Caustic Soda."*

*Mathieson* Chemicals

SODA ASH . . . CAUSTIC SODA . . . BICARBONATE OF SODA . . . LIQUID CHLORINE . . . BLEACHING POWDER . . . HTH AND HTH-15 . . . AMMONIA, ANHYDROUS AND AQUA . . . PH-PLUS (FUSED ALKALI) . . . SULPHUR CHLORIDE . . . CCH (INDUSTRIAL HYPOCHLORITE) . . . DRY ICE (CARBON DIOXIDE ICE)

# *The Reader Writes:—*

### We Defend Only Unpopular Causes

Has your pen lost its cunning or is your good right arm palsied? Why haven't you blasted the dirty, double-dealing, disgraceful plan to pad the Supreme Court?

New York City — JAS. F. ALBEE.

### Write Your Own Answers

The Department of Commerce informs me in one of its innumerable bulletins that the consumption of shaving soap is growing rapidly in Palestine. Such juicy news ought to be good grist for your enjoyable "We Page"—for example:

Are the rabbis becoming unorthodox?

Have Williams or Colgate put out a strictly Kosher brand?

Will the Hollywood sheiks lose their cute little hair-lips?

Or what have you?

New York City — C. PAUL KENYON.

### Forget-me-nots for Executives

Orchids to my fellow Pennsylvanian John M. Thrall for his protest against the generosity of Messrs. Farley and Roosevelt at the expense of Mr. and Mrs. Average Citizen. For all his modest violet manners he stands forth like a bed of red cannas in the public square.

To keep up the botanical vein, may I make the suggestion that the white collar executives should all adopt as their badge a neat little bunch of forget-me-nots, for of all classes of our people they seem to be the most completely forgotten. They are not overlooked because they are so important in our business and social communities that they cannot be ignored; but nobody seems to take any trouble to look after their interests, and they are too busy and too frightened to do it for themselves.

Today they are standing right on THE spot. They are the men who actually direct the companies that give the capitalist a chance to invest his money profitably and give the worker a job. They are the buffer between these two, and yet they make possible what each class must have to live. They are damned if they do and double-damned if they don't, and yet if they went on a sit-down strike they could paralyze the country more completely than Boss Lewis ever dreamed or Boss Morgan ever feared. They "run the works" of the nation. They pay most of the taxes; support most of the churches and colleges and hospitals. They do the planning and then get out and put the plans across. They don't enjoy any eight-hour day, and they don't get paid half as much as the salary lists of the top-notchers would lead a newspaper reader to think. The forget-me-not is their state flower.

Philadelphia, Pa. — ALFRED E. SEYMOUR.

### "The Hours I Spend with Thee"—

I spend more time with your magazine than with any of the nine other technical trade journals I receive regularly.

Springfield, Mass. — JOHN F. RADEBAUGH.

### From a Friend

Although frequently cockeyed your editorials are always interesting. Your news is often stale, but always good reading. I like you a lot.

New York City — JOHN A. CHEW.

### Roses from England

CHEMICAL INDUSTRIES is read from page one to the end, and as there are always articles of interest to at least several of our departments it is passed around to all concerned, since we find it the best way to keep-up-to-date with American developments.

London, England — F. W. BERK & Co., LTD.

### Paging Dr. Marek

Thank you and L. F. Marek for the two splendid articles on the chemicals being used in modern petroleum refining. This is just the kind of up-to-date information on the newer uses of chemicals that makes CHEMICAL INDUSTRIES indispensable to me as a means of keeping posted on commercial chemical developments.

Washington, D. C. — LOUIS SORBELLI.

### The Rules of the Game

I recently came across a statement by great Roosevelt which is very interesting as a comparison of the ideals cherished by his second cousin.

"Take what I mean when I speak of the 'Square Deal.' I mean that in the game of life, if the rules allow any special privileges to any group or class of individuals, let us change the rules of the game."

So said T. R. who with his remarkable insight into human nature branded F. D. R. years ago as a "maverick."

Detroit, Mich. — HENRY B. KEATING.

### Safety First—and Last

The Safety Contest of the National Safety Council has this year thirty-four entries in the Chemical Section, which is evidence of the growing realization of the importance of this fine movement in chemical plants. You have from time to time given editorial support to this effort and yet not often enough. It is a subject that has to be pounded away at, day and night, year in and year out. Won't you help more?

Buffalo, N. Y. — WHITNEY NORTON.

### "The Outside Point of View"

Your editorial on "The Outside Point of View" ought to be printed in some scarehead type and hung up in every company's research department. I have been on both sides of the fence and have good reason to have learned the soundness of your views on this subject. Yet there is very often a distinct antagonism to the outside consultant on the part of the inside staff. It's understandable, but can only be the result of jealousy or shortsightedness and it arises too often from the fear that pet projects will be scrapped or slipshod work exposed. The temptation for a good man to get off on some hobby and for a poor man to soldier on the job is very great in a large organization. The simplest remedy is an outside checkup, although it must be confessed that some of the so-called outside experts are not always competent and they are sometimes trouble-makers, if they believe they must make a showing by upsetting the applecart.

Winter Park, Fla. — WALTER J. GREGORY.

CHEMICAL INDUSTRIES

*The Chemical Business Magazine*

Consulting Editorial Board
R. T. Baldwin, L. W. Bass, F. M. Becket, B. T. Brooks, J. V. N. Dorr, C. R. Downs, W. M. Grosvenor, W. L. Landis, and M. C. Whitaker.

ADVERTISING PAGES REMOVED

# *Prices and Wages and Profits*

DURING the past ten years we have spent stupendous energy and uncounted billions in a world-wide attempt to declare the economic law null and void. Great governments have legislated it out of existence. Powerful cartels have ignored it and strong labor unions have tossed it into the wastebasket. All this colossal effort to circumvent supply and demand has been proved, within the past six months, to have been quite futile.

Destroy foodstuffs or subsidize greater crops. Fudge the national balance sheet and reduce the monetary unit to the value of boiler punchings. Ban imports, or exports, or both. Make it a capital offense to put up the price of beans and to lower the price of diamonds. Nevertheless, values will surely find their true equilibrium level. The road of economic progress may be torn up or blocked. Detours may be necessary and speed reduced. But in the end prices and wages and profits all must strike a balance over the fulcrum of supply and demand.

Private monopolies, be they controlled by capitalists or by laborites, have long had serious effects upon that balance. They will upset it again and again in the future; but their disturbance of supply and demand is to the effect of government action as a milligram to a ton. For governmental interference with economic law acts as a powerful legal, public monopoly. A tax or a tariff more widely and seriously affects the country's economic development and the daily life of all of us than does any price pool or any labor racket.

Therefore, unless all of us, wage earners, executives, stock-holders, are to be caught in a political roller coaster and taken for a bumpy ride that ends in an economic crash, we need more men in our plants, in our stores, in our banks, among our directors and our labor leaders, who are grounded in common commercial economics.

Williams Haynes, Publisher, A. M. Corbet, Publication Manager; W. J. Murphy, Editorial Manager; W. F. George, Advertising Manager; D. O. Haynes, Subscription Manager; J. H. Burt, Purchaser.

### *Public Research at a Profit*

Twenty years ago Ignacy Moscicki, now the President of Poland, organized a private company to carry on chemical research for industry which has since become a unique and conspicuously successful public institution. Its profit-making features were voluntarily relinquished in 1922, and all earnings are now devoted to the prosecution of further new research. Its income is derived not only from the ordinary professional fees, but also from rents and royalties, and it regularly maintains departments devoted specifically to chemical analysis, to inorganic industry, organic synthesis, coal, alcohol, and synthetic rubber. Its chief work is on raw materials (with particular reference to improving and extending the use of Polish supplies), petroleum, natural gas, sulfuric acid, coal and coke, aluminum, and rubber.

The Chemical Research Institute of Warsaw has never been subsidized either by the government or by industry. From its inception it has been a thoroughly business-like enterprise which has paid its own way. Its fine building and equipment were provided just ten years ago by the personal subscriptions of Poles from all over the world. It serves as a sort of combined Bureau of Standards, Mellon Institute, National Research Council, and Chemical Foundation. It is to us Americans an extremely interesting example of self-help and cooperation upon a sound economic basis between chemical science and chemical industry. We congratulate them heartily upon the double anniversary—of their founding and of their building—which they have been celebrating.

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### *Improving Our Fertilizers*

The revisions of the North Carolina fertilizer laws proposed this current session of the state legislature summarize some important, practical improvements that are being made in American fertilizer practice. The "high-test" movement is helped by raising the minimum allowable plant-food content from 14 to 16 per cent. Recognition of the "trace elements" is made by providing a place for them in the published analysis. The requirement that the label shall state plainly whether a formula is acid-forming or not, is evidence that the pH values of soil are beginning to have some real meaning to the dirt farmer of the southern states.

These are all healthy signs. For many a long year our fertilizer makers have been telling the facts that underlie these more intelligent uses of fertilizers, but field application has lagged far behind the knowledge of what good practice might be. For this deplorable state of affairs the conservatism of the average farmer has been chiefly to blame. The nasty implication that the fertilizer industry has selfishly held back progress is a libel on an industry that, whatever its faults, has been generous and sincere to a degree in giving its customers honest, scientific help in the best use of materials it sells.

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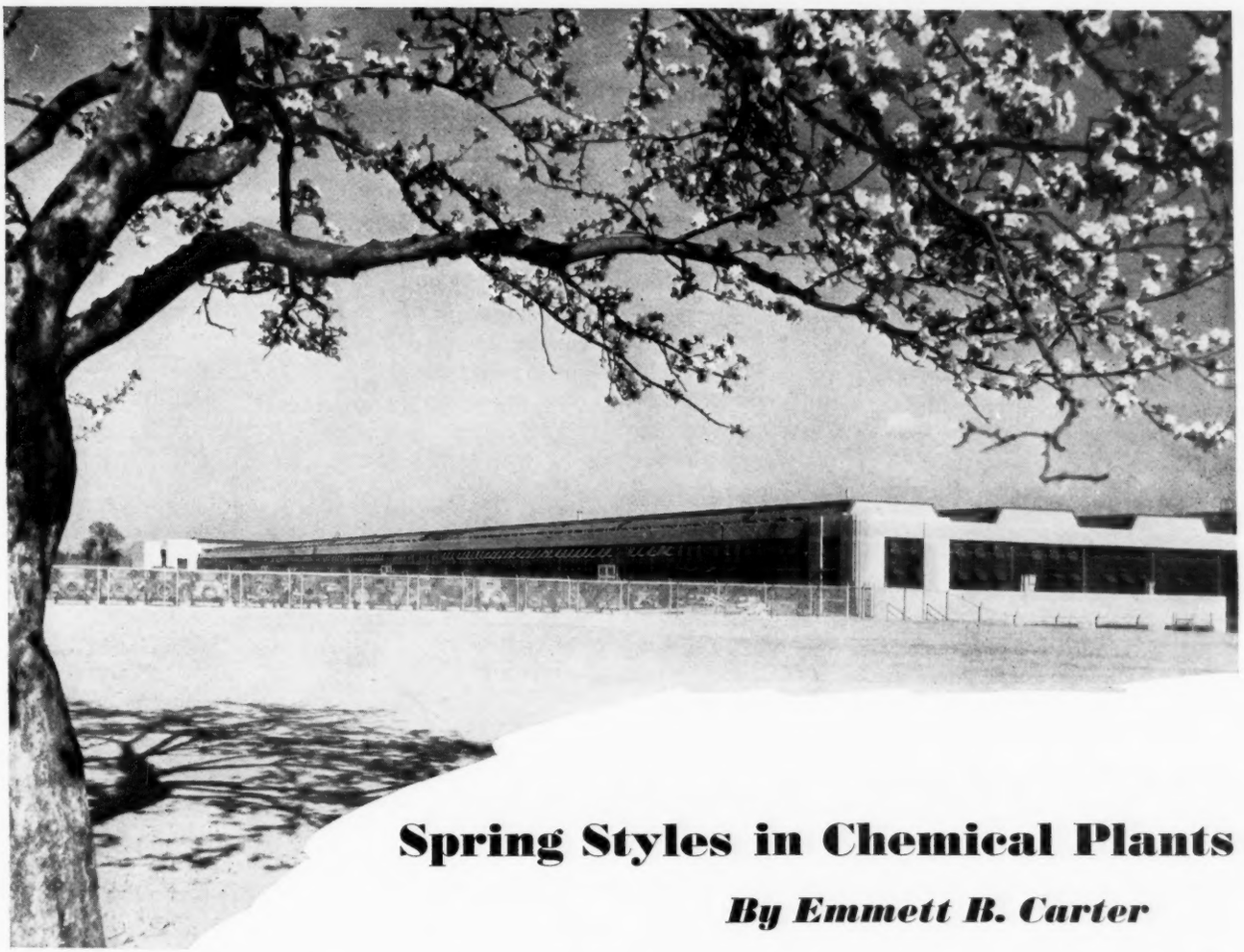
### *Science and Craftsmanship*

At the conference on the textile industry's many problems held in Washington last month no solutions seemed more apt to be practically useful than those that proposed a technical attack. This thought is supported by the actual experience of the New England mills and dyehouses. From this most "depressed area" comes most encouraging news. After a gruelling process of elimination, the survivors are beginning to recuperate and those in the most healthy condition are those where operations have been brought now under chemical control.

Like many chemical processing industries the making and finishing of cloth is a curious, intimate blend of science and craftsmanship. The demand of the thread-maker for lime bleach; the tradition of color matching by instinctive rather than exact dye-mixing; the practice of the calico printer in his sizing operations, all seem medieval from the point of view of the scientifically trained technician. But results count, and the textile industry is quite correct in cherishing its craftsmen and in defending their rule-of-thumb methods. Cotton spinning and all textile finishing in New England are bound up in the future with this priceless "know how," the ability to get finer results than less experienced, less intelligent, less artistic workers can produce.

This does not, however, exclude science. Exact knowledge in purchasing and exact practice in operation both have their place. Their value is as great and as practical as the gifts of instinctive skill, and this is proved by the balance sheets of what are generally known as "progressive firms." Both these elements are necessary to meet the low price competition from Central Europe and the Orient. Combined and concentrated upon the production of the finer grades of quality goods they can offset even the great differences in wages and working hours that have so completely upset the world's textile production.



# Spring Styles in Chemical Plants

***By Emmett B. Carter***

WITH plant construction now under way again, we realize that engineering developments have not been standing still since 1929. Where are we headed? Is there some definite trend to modern plant design?

In the chemical field we are actually moving in the direction of buildings like huge tents of more or less standard design. If we change our processes, or are forced to abandon the plant entirely, the buildings themselves will be very suitable for some other operation or even for a different line of manufacture. Simply from the investment point of view, such a plan would indeed be most desirable. But once, we preached the theory that the factory being a part of the manufacturing equipment should be designed to suit that particular arrangement of equipment with reasonable provision for future extensions, etc. Those of us who have designed chemical plants, have considered it quite standard practice to design our equipment first and then to work out a building design for that equipment.

Certainly, it is hard to think of starting any chemical project, without plotting flow sheets showing raw material quantities moving in and through the various processes and on out for shipment. Can we do this economically, and at the same time limit our arrangement to fit inside of standard column spacings, headroom and other building restrictions? This is not usually a simple matter in chemical plant design. But it is being done.

Great stress used to be laid on the importance of using gravity to convey materials whenever possible. The number of multi-story chemical buildings throughout this country testify that designers considered it good practice to take raw materials to the top floor and then process on the way down, using gravity to drop the dry materials through chutes and the liquids in pipes from floor to floor and process to process. However, any multi-story building is an expensive type of construction. Much space is lost by stairways and elevators. Supervision is more difficult. Lighting is limited to side windows, and if processes are later changed or more space needed for some one operation, a situation sometimes develops where we need a Sherlock Holmes to solve the tangled problems.

After all the advantages and disadvantages are considered, a multi-story building can seldom be justified except on the basis of expensive land value. Obviously it costs more to build a storage bin up in the air than on the ground, and the same thing holds for supporting heavy equipment. As for high land values: why build on expensive land? Most chemical workers now come to work in their automobiles and we have accordingly a much wider choice of plant sites. The development of silos for storing materials has gotten us away from

the idea of having bins as a part of a building. The lighting problem is simplified by the possibilities of getting daylight through the roof of the one-story building. Efficient works managers insist on good lighting and as most of our operations are done during daylight hours, it seems short-sighted not to make as good use as possible of natural light when it is so much superior to any artificial lighting.

Monitor types of roofs give excellent daylighting by running the roof monitors at right angles to each other. The Briggs Mfg. Co. at Detroit has a zig-zag design of monitor. This brings in light from all points of the compass. Ford has a building where horizontal monitors are superimposed over the top of longitudinal monitors to get the same results. The use of an anti-glare wash successfully excludes the objectional rays of the sun. Many designers are sticking to the saw-tooth roof and when this design is used with the glass to the North, no anti-glare wash is needed and a fine uniform light results. Opinion is still divided over the glass being in a vertical plane or on a slope.

Ventilation is much better understood, thanks to the manufacturers of ventilating sash and roof ventilators. Both have been most energetic in research and being more or less rivals have served as a check on the other.

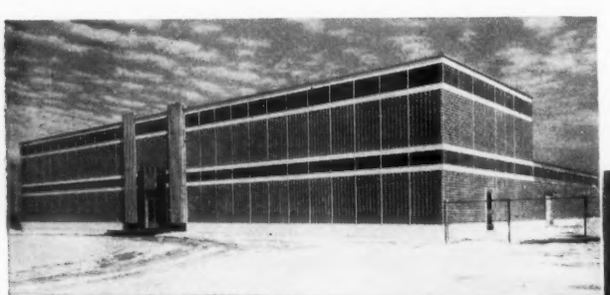
When we turn to materials of construction, we find that the steel frame building has certainly pushed into the lead. The welded frame has not made the headway that many expected, but it is slowly developing and is coming, many feel, as a sound evolution. When the shell of the building is to be all steel, one is no longer limited to corrugated steel sheets. Several designs of flat sheets have appeared, some of interlocking design. Others have the sheets covered with asphalt, asbestos felt, and a water-proof paper covering like the huge building erected at the Gary Plant of the United States Steel Co., or covered with a 1-inch wood fibre insulation, on top of which is a four-ply tar and slag waterproofing. The Kelsey Hayes Wheel Co. has a new building covered with asphalt-asbestos and aluminum sheet. Such materials are of special interest in the field of chemical manufacturing.

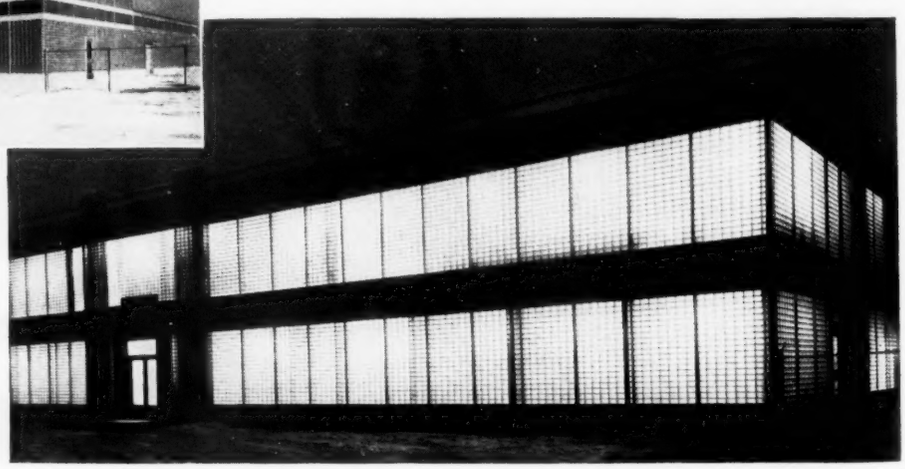
Roofs of concrete or gypsum are still being used, and in fact our old friend, the wood plank roof, is still favored where there is a corrosive atmosphere. But the air conditioning engineer asks us, "Why have a corrosive or a damp atmosphere?"

Air conditioning is spreading by leaps and bounds. Looked upon at first as a desirable but pretty expensive refinement (I confess having been a "man from Missouri" in this matter), it has actually brought great savings in many plants in unexpected ways. Leaders in using it are the textile industries where an atmosphere of proper dampness prevents threads breaking and greatly speeds up production. Likewise the tobacco industry saves loss from dust and the breakage of valuable cigar leaf by controlling dampness and their workers turn out greater production.

Of all the new buildings erected recently, few excite the interest of the chemical industry more than the beautiful Research Laboratory of the Owens-Illinois Glass Co. at Toledo. Glass is something that the chemist understands and these glass bricks are of great interest to him. While they are only 3⅞ inches thick, they have insulating properties of a fairly thick brick wall. At one stage of their manufacture, these bricks consist of two square glass pans. One pan is inverted on the other and both welded together at high temperature. This leaves the air space on the inside of the brick in a vacuum state. Due to external and internal ribs on the faces of the brick, the light passing through is well diffused and while the light transmitting properties are very high, one can not even see the shadow of a person walking on the other side of such a wall. Needless to say they are being given great consideration for both outside and inside factory walls as well as office partitions.

Many nice little refinements of factory construction have been quietly developing during the depression that are apt to be overlooked. Chemical industry is having its own building boom and these new developments ought not to be passed over without careful investigation.





*A day and night view of the Packaging Research Laboratory, Owens-Illinois Glass Co., Toledo, Ohio.*

# If War Comes
# What of Chemical Supplies?

***By Dr. Herbert Levinstein, F. I. C.***

***First-hand experience from a man who lived close to the core of the World War's chemical problems with lessons in preparedness and neutrality that America should heed. From the Presidential address delivered at the Fifteenth annual meeting of the Institution of Chemical Engineers.***

THE most careful plans for mobilizing military forces have been at all times for generations past docketed at the headquarters of the General Staffs of the Great Powers. Industrial mobilization, or the provision of complete plans for industrial mobilization, is comparatively new, and is a result of the above.

That war involving the principal Powers of Europe may come at any moment is clear. I do not think that war on a European scale is necessarily imminent. That is quite another matter. I do say, without fear of contradiction, because events compel assent, that the possibility is always there. When it does come it will be sudden and overwhelming.

Industries quite unprepared for war cannot suddenly be switched on to the requirements of war without great delay and immense cost. I propose to illustrate this with examples taken from our experience in the Great War. If planned in peace time and spread over a number of years, rearmament goes forward methodically and comparatively quickly in a totalitarian State. Here in England, where rearmament at present has to be accomplished without dislocating the life of the people or the industries by which they live, the difficulties are much greater. The chemical industry is now, in my opinion, the most up-to-date and best-organized industry in this country. The contrast with 1914 is, indeed, astonishing.

In 1914 war was not expected by the chemical industry here. The idea seemed bizarre to the commercial classes. The domination of the great German dyestuffs companies and the dependence of our textile trade on these companies, was frequently pointed out by those here engaged in the dyestuff industry. Not one person in the textile industry or the dyeing trade or Government Departments took, as far as my experience goes, the slightest interest in such a warning.

Picric acid (lyddite) was the high explosive of the Army. Small quantities of T.N.T. had indeed been purchased by the War Office, but from abroad. I should hesitate to say that the Navy had any high explosives at all; at any rate, torpedo heads and mines were filled with gun-cotton. The difference in effect between a propellent such as gun-cotton and a high explosive such as T.N.T. was tragically displayed when Aboukir, Hogue, and Cressy were torpedoed early in the war.

Uniforms and the Mills' equipment were dyed with German dyes. Nobody gave this a moment's thought. When Kitchener's armies were hastily formed, serious training was impossible until they were provided with uniforms. The woolen mills and clothing factories, working to capacity, gradually supplied them. It is a little-known fact that, owing to the forethought of our industry and quick measures spontaneously taken, the woolen manufacturers were never held up by a shortage of khaki dyes. If they had been, Kitchener's army would have come into the field months later.

What, then, was the situation as regards high explosives on August 4, 1914? The main responsibility for the supply of high explosives to the army lay with the Director of Artillery, War Office. Two branches were concerned: A.6 for High Explosives and A.7 for Propellents. The quantities of picric acid that could be manufactured were very small and the method wasteful. A few tons of T.N.T. had, I believe, been made in this country before the war. But when T.N.T. was adopted by us as a high explosive during the war, following the German example, there was practically no established manufacture in this country.

It was necessary for the War Office to see what industry could do and, at their request, the Board of Trade investigated the possibility of increasing the supply and securing the necessary raw materials. A committee was therefore formed, the first meeting of which was held on November 16, 1914. Pray note that we had then been at war for three and a half months.

At that time the requirements of high explosives were estimated to be approximately 1,400 tons per month. It was found that there were a few firms, mostly small firms, able to manufacture picric acid. In January of 1915, after five months of war, five firms were so engaged, with a total monthly output of

approximately 130 tons; T.N.T. was being made by two firms, with a monthly production of 35 tons. The deficiency was large. To show how amateurish at that time was the direction, I might say that Lord Moulton was of opinion that there would be plenty of fuming sulfuric acid available for both his program and for others. He persuaded me not to put down the fuming acid plant required to serve the large intermediate department of the new dyestuff industry. Needless to say, the supply of this promised acid was not available when it was wanted. From these small beginnings grew the great department of high explosives supply at Storey's Gate.

In December, 1914, the committee recommended that the Government should take possession of all the picric acid in the country. By June, 1915, the responsibility for providing all explosives to the army was transferred from the War Office to the Department of Explosives Supply (D.E.S., Ministry of Munitions). At this point, I would like to remind you of the great service rendered to the allied cause by the du Pont Co., of America. Their great organization threw itself wholeheartedly into the manufacture of the propellents and high explosives required by the Allies, especially France. There was no amateurism here. Thus, in the early days, it was possible for Storey's Gate to purchase explosives from du Pont and others in America to make up for our own deficiencies. Thus we were able to buy from abroad, in the course of the war, the following quantities, which helped to bridge the gap:

| | Tons |
|---|---|
| Propellent— | |
| Nitro-cellulose powder | 220,239 |
| Nitro-glycerine powder | 54,855 |
| H. E.— | |
| Trinitrotoluol | 31,600 |
| Picric acid | 1,383 |
| Ammonium nitrate | 18,300 |

Picric acid can be made from chlorbenzene through dinitrochlorbenzene, the latter being used by dyestuff manufacturers for making the well-known dinitrophenol sulfur blacks. This method was largely used in Germany during the war, and to a smaller extent also in this country.

All methods for making picric acid involved the use of benzene; all but the last-named one, the use of phenol. The phenol obtained from coal tar proved in this country, as also in Germany, insufficient, and plants for the synthetic product were erected by various concerns under the direct auspices of the Department. Five private firms and three government factories (one of which never came into real production) were engaged in making synthetic phenol. No less than 98 firms were contractors for supplying benzol, toluol and carbolic acid crystals. By November, 1916, there were 17 makers of picric acid in this country, and the production was 449 tons per week or 1,800 tons per month, many times the production of the previous year (about 14 times), and more than the total anticipated requirements of high explosives (1,400 tons). The total production of picric acid in the country during the war was approximately 71,000 tons, an average of 1,400 tons per month, which was the estimated requirement for all explosives in 1915.

At first the toluene required for T.N.T. was contained in benzol obtained from coke ovens, gas works, and tar distillers. The output of benzol in 1913 was 18 million gallons from coke ovens and 5 million gallons from gas works. The extraction of toluene was a problem, as few distillers had suitable fractionating plants. Naturally, the Moulton Committee advised that stocks of toluene be requisitioned.

Very considerable difficulties were experienced, not, let me say, in placing contracts for the supply of T.N.T., but in obtaining delivery from entirely inexperienced, indeed, ignorant people with whom in certain cases contracts were placed. As the Department grew in strength, knowledge, and experience, and their own plants came into operation, some of these works were taken over and administered by the Government. The location of some plants was such as to startle any chemical engineer conversant with the manufacture of explosives. A number of them could not be licensed for the manufacture of explosives under the Explosives Act of 1875.

The risks run by the workers, the property owners, and inhabitants of the neighbouring crowded areas in which many of these factories were situated, were having a prejudicial effect on the prices required by contractors. Naturally, it was undesirable for the Government to pay a higher price for explosives merely because these factories were placed in crowded centres. At the same time, this emphasized the amateurish, hasty, and careless way in which many of these early plants were built.

Altogether, 16 private firms were employed in making T.N.T., as well as 12 government factories. In November 1916, only two years after war was declared, a weekly output of 1,080 tons of T.N.T. was produced from 17 sources, that is, a monthly output of, say, 4,500 tons, over 120 times the output of January of the previous year and more than three times the estimated total requirements of high explosives originally made. The total production of T.N.T. in this country during the war was 172,647 tons, an average of 1,385 tons per month.

Naturally, the gas companies were asked to strip their gas of benzol. One department of the D.E.S. had to keep in close touch with gas works, coke-oven plants, gas-producer products, and tar distillers all over the country. I will give you the figures for one month in 1918, which will show the complexity of the task.

In that month,

| | Tons of tar |
|---|---|
| 1,430 gas works produced | 73,000 |
| 114 coke ovens produced | 44,625 |
| 21 gas producer plants produced | 895 |
| 182 tar distillers, etc. | 108,113 |

The amount of toluene obtained in this way would have been quite inadequate for the manufacture of the above quantities of T.N.T. Here the Dutch came to our assistance. A fraction of Borneo petroleum contained about 55 to 60 per cent. of toluene which could not be separated by fractional distillation. On nitration to the mononitro body only the toluene in the fraction reacted. The mononitrotoluene could be separated from the unreactive paraffins very simply. This Borneo petroleum became indispensable to the completion of the T.N.T. program.

### Amatol

The most important high explosive used towards the latter end of the war was amatol, a mixture of ammonium nitrate and T.N.T. in varying proportions, the 80—20 mixture being largely used. The pre-war production of ammonium nitrate in this country was negligible. Calcium nitrate could, however, be imported from Norway, where the Birkeland-Eyde process, in which the Badische had formerly been largely interested, was worked on a large scale. The double decomposition of calcium nitrate with the ammonium chloride liquor obtained in one phase of the ammonia-soda process was the method first used in the manufacture of ammonium nitrate. The first contracts for ammonium nitrate gave a weekly output of about 150 tons. With increased plant and the erection of new factories, weekly output reached the imposing figure of 3,000 tons per week—say, 12,000 tons per month. The total production in this country during the war of ammonium nitrate was 322,181 tons, much more than the combined output of picric acid and T.N.T. Today, when atmospheric nitrogen is converted at Billingham into ammonia, and nitric acid is made by the oxidation of ammonia, all the raw materials for this explosive are found here in limitless profusion.

Fuming sulfuric acid was most astonishingly lacking in this country. There was a Mannheim plant at Clayton; Nobel's had their Tenteleff plant; there was Messel & Squires' famous firm in London. I am perfectly clear, however, that before the war if we wished to buy oleum from anybody, it came from Germany. The chamber process still ruled unchallenged in the British Isles. Ship-loads of oleum, packed in drums, had therefore to be obtained from America—packed sometimes in leaky drums—devil's broth for cargo!

We became independent of imported oleum only after a year and a half of war. The national factories put up Grillo plants burning sulfur, not pyrites. The advantage of sulfur was the saving of cargo space and that one could erect such plant without knowing how to purify the burner gases obtained from pyrites, to prevent the catalyst being poisoned, a very material consideration. To save sulfuric acid it became compulsory to use nitre cake, then a by-product of nitric acid manufacture, wherever possible. The Department had no less than 115 different factories, including those of 42 firms making sulfuric acid. By September, 1918, the production of concentrated sulfuric acid and oleum was:

| | Tons per week |
|---|---|
| Sulfuric acid (C.O.V.) | 4—5,000 |
| Oleum | 5—6,000 |

It would be taxing your patience to take you through the delays that occurred, the number of firms, some inexperienced, which had to be used to obtain the many other materials, which were controlled by that great and effective machine, as it became, the Department at Storey's Gate: glycerin, cotton waste, acetone, alcohol, ether, and the difficult and dangerous substances required for chemical warfare. I have said enough to show the terrible delay, prolonging suffering and death, inevitable to going to war with our chemical industries as they were in 1914. Just consider, eighteen months of war elapsed before we were independent of imported fuming sulfuric acid!

### Chemical Equipment

There was little experience here in making chemical plant. Autoclaves came exclusively from Germany, as did all acid-resisting enamel-lined pans. Nearly everything had to be specially designed; little standard plant was available; few well-trained chemical engineers could be obtained. In 1916, 250 chemists were recalled from the Chemical Corps in France for service at home, so acute was the shortage, and an appeal was even made to the Australian Government, who let us have 22 chemists. The colossal size of some of the large national factories, erected towards the close of the war, will scarcely be realized by those who never saw them. Gretna was nine miles long.

It should not be thought that the machine was careless of yields. It carried out a great work in a highly competent manner. Accountancy and costing, for instance, were carried out stringently. The waste lay in the hurried erection of *ad hoc* plants in wartime with largely unskilled personnel, using processes many of which had no peace-time value, a stupendous waste, not only in terms of money, material, and labor, but in lives. We were an unprepared, peaceful, individualistic, and industrially unorganized people. Thus the war was prolonged almost beyond endurance while we prepared, organized, and then struck.

Very different was the position in Germany. Some years prior to Farbenfabriken vorm. Friedrich Bayer, the Badische Anilin and the A.G.F.A. formed a combination, and another group was formed by Meister Lucius and Bruning (of Hochst), Casella, and Kalle. At once, therefore, the German Government had the nucleus of a centralized and organized industry for the chemical production of munitions of war. During the war these two groups amalgamated and strengthened by the inclusion of Griesheim Elektron, the Weiler ter Meer, the Leonhardt Co., and some smaller concerns, and the great combine now famous as the I.G., came into being.

This centralization in an industry of such importance in war proved to be of the utmost value to Germany. It

enabled her to continue hostilities in spite of the blockade. It was possible for newly-discovered processes to be worked immediately in factories best suited to the operations and, indeed, the I.G. works produced the bulk of the synthetic ammonia and nitric acid needed for fertilizers and explosives and a high proportion of the high explosives and all, as far as is known, of the poison gas. The blockade seems to have given a fillip to the chemical engineering profession in Germany, for when the shortage of materials became pressing, operations were carried out, such as the manufacture of nitric acid from ammonia, the use of paper crêpe in the preparation of nitro-cellulose and of glycol instead of glycerin, to say nothing of the manufacture of rubber and a dozen substitutes for every-day requirements.

A plant at Ludwigshafen used before the war for the preparation of ethylene and ethylene chlorhydrin in the early stages of the synthetic indigo production, when mustard gas was being manufactured, was used for the production of thiodiglycol, which was then sent to Leverkusen for conversion into mustard gas. In the same way, several other works combined in the preparation of diphenyl-arsinic acid in the azo-dyestuff departments used for the production of diphenylchlorarsine, and doubtless many other instances could be cited.

### Erection of Poison Gas Plants

In England there had been little development of the manufacture of organic chemicals. Consequently no plant was available for the manufacture of poison gas; this had to be designed and constructed. In Germany the necessary plant was in existence, supplies of a new gas could be manufactured in a comparatively short time and large-scale operations were thus made infinitely easier than in Great Britain. It does not appear that Germany mobilized her dye factories for war service until some time after the outbreak of hostilities, many of the chemists having been called to the colors. With the rapidly expanding consumption of munitions of all kinds (the battle of the Marne exhausted all the German stores of shell), new plant was laid down and many chemists were released from military service. Standardized plant used in the manufacture of dyes was converted for explosives production with extraordinary rapidity; in fact, one plant at Leverkusen, producing 250 tons per month of T.N.T. was put into operation in six weeks.

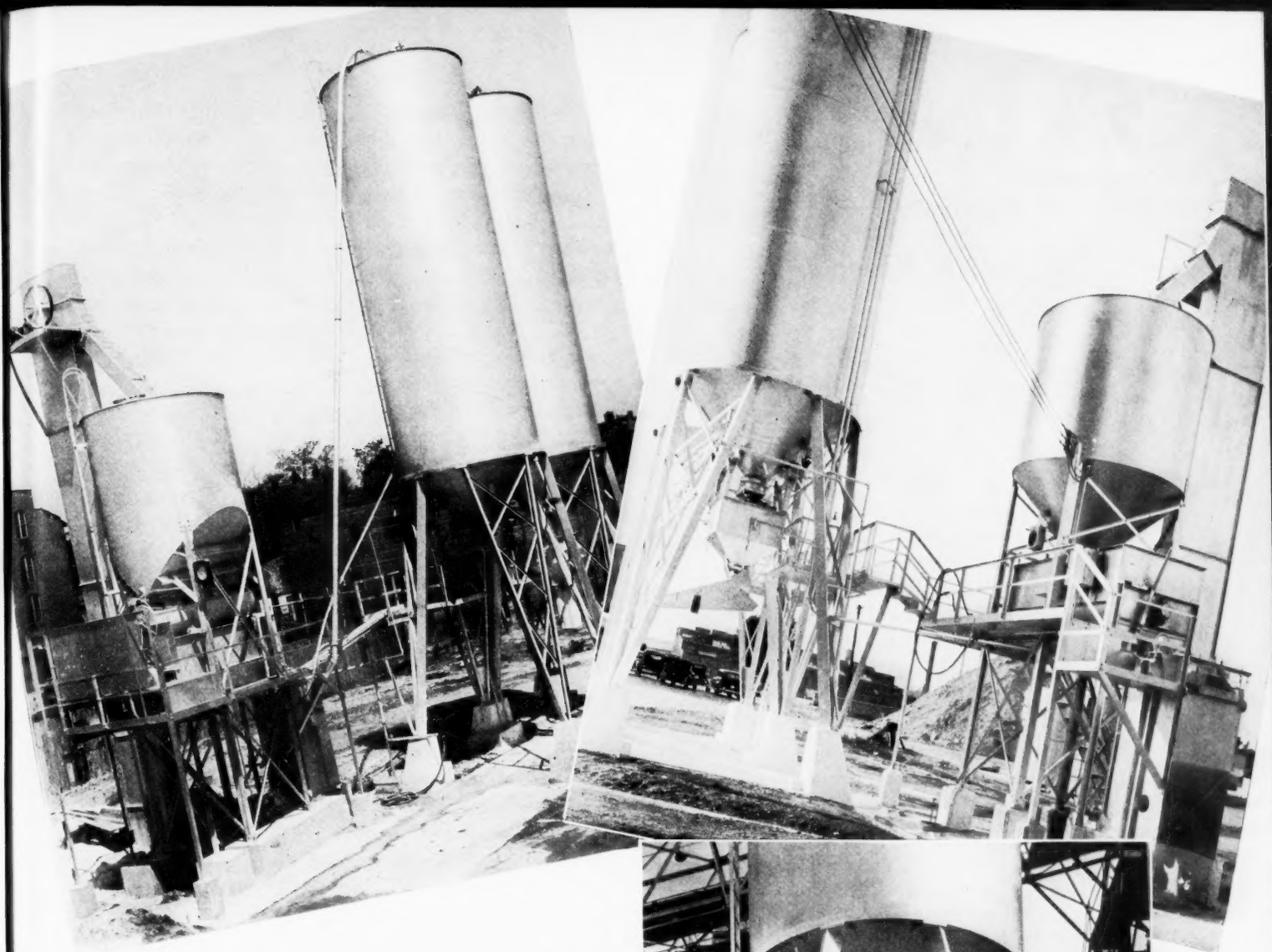
Again, with regard to poison gas, the original requirements were chlorine and phosgene, but subsequently many other organic substances were used. Several of these were new and not easily prepared, but these difficulties were overcome by the ease and speed with which the peace-time facilities of the I.G. factories could be converted for this war-like purpose. Germany was indeed dependent on her dyestuff plants for power to continue at war. The principal but far from sole example of this was the development of the Bosch-Haber process for the production of ammonia from the nitrogen of the air. The blockade cut Germany off from her supplies of Chilean saltpetre, but she had become independent of them.

Since the war there have been several developments of importance in the organization of chemical industry. First, and most important, is the formation of the I.C.I. in 1926, an amalgamation of Brunner Mond and the United Alkali, with Nobel Industries and British Dyestuffs. With the exception of fine and pharmaceutical chemicals, artificial silk, films and photographic material, I.C.I. covers the whole of chemical industry. The omissions are mostly part of a sound policy. The I.C.I. does not manufacture finished products where existing firms to whom they supply either the raw materials or intermediate products cover the ground.

Another important step which took place in 1916, during the war, was the formation of the Association of British Chemical Manufacturers. The main objects were to promote close co-operation, to form a medium for placing before the Government and its Departments its views on matters affecting the British chemical industry, and to take any other measures which might be for the benefit of the whole industry. It was active in the reorganization from a war-time to a peace-time basis. As the result of endeavours to bring chemical manufacturers and plant workers together, and of the increasing interest in specialized branches of the industry, other associations, now numbering thirteen, have been formed and become affiliated to the Association.

Another development is the formation of our own Institution. This is a direct outcome of the war. The need for trained chemical engineers in industry became apparent during the war and the late Prof. Hinchley gathered together a band of enthusiasts who, after much effort, saw the Institution soundly established. The Institution has always been deeply interested in the training of chemical engineers, and has always done all in its power to assist universities and technical colleges which have signified their desire to provide courses in chemical engineering, and possess the necessary facilities for conducting such courses. The Institution is an examining and qualifying body, and demands a high standard of professional attainment from its members and associate-members. It has a register of trained chemical engineers easily available in time of emergency, its members being engaged in a wide variety of manufactures in a great variety of firms.

I have tried to show why other countries have their Five or Four Year Plans, for they know that war, if it comes, will come swiftly. They wish to mobilize the full power of their population when the bell decreeing mobilization clangs its sharp decisive note. They do not propose to allow precious time to any they may wish to strike. We are not so unprepared in all matters as may sometimes be thought. At least in the chemical industry we are stronger in every branch, more compact in structure, more complete in scope, with large units ably directed.



## Aged Lime Putty "On Tap"

A plant for processing and aging lime putty consists of a raw lime storage bin, mechanical slaker, vibrating screen, hydraulic pump, aging tanks, batcher, and the necessary conveying equipment, all in a compact arrangement, the entire plant occupying only a small area of land.

Top, right, view of lime putty plant at Wilmington, Delaware, showing slaking equipment just below storage bin at right. Raw lime flows from the bin by gravity into slaker, water being added to offset the heat generated during the slaking operation. The slaker is equipped with revolving blades which keep the mixture in motion at all times.

Top, left, lime putty plant, at Washington, D. C., showing recording thermometer which provides chart of temperature in slaker so that it is possible to guard against burning or drowning of lime during slaking process. When slaking is complete the batch passes through a vibrating screen and is pumped to storage tanks for aging.

Opposite, trucks are spotted beneath these lime putty aging tanks, the putty passing through a watertight gate valve into the suspended measuring batcher and then through the chute directly into the waiting truck.

# ZEIN

## *A Protein from Corn with New Uses*

**By J. F. Walsh**

**American Maize Products Co.**

CONSIDERING only those characteristics of corn proteins that are of significant prospective industrial application, an examination of their composition and characteristics reveals their similarity and reactivity in many respects to already accepted and well established natural and synthetic resin products; such as casein, shellac, cellulose derivatives, thermoplastic synthetic resins, and the protein compositions of soya beans.

Unlike most chemicals the corn proteins are not readily identified through the usual chemical reactions, but they are separated and classified by their selective solubility in various solutions. Broadly, they are comprised of albumins, soluble in water; globulins, soluble in dilute salt solutions; glutelins, soluble in dilute alkali; and the prolamines, native only to grains, soluble in aqueous alcohol solutions.

The gluten, because of its high protein content—approximately 50% protein, 35% starch, 5% oil, a small amount of fibre and mineral matter—is taken as the base from which the various industrial proteins are isolated. These at the present time comprise three general types; namely, the whole carbohydrate free protein, the carbohydrate, aqueous alcohol soluble free protein, and the aqueous alcohol soluble protein "zein," each available in various special forms.

The first, the carbohydrate free protein, is produced in the form of carbohydrate oil free, carbohydrate free bleached, and carbohydrate oil free bleached, all differing slightly in characteristics and intended uses. As a group they find principal use in the plastics field as a plastic base, filler, and reactive component in cellulose derivatives, natural and synthetic resins and also as a raw material for the preparation of amino acids, particularly glutamic acid and leucine, glutamic acid constituting the essential component of mono sodium glutamate, the familiarly known synthetic beef flavor.

An approximate analysis of the substantially carbohydrate, oil free bleached protein is: Moisture, 11.0%; Protein, 76.5%; Ash, 1.2%; Oil, 1.1%; 80% alcohol soluble, 35.8%; Fibre, 4.0%; Starch, none.

This group of whole proteins is in general thermoplastic, relatively light colored, and reactive to dilute alkali solutions, and formaldehyde, phenols, and aqueous alcohol solutions, and thus offers a base for a relatively wide range of plastic products and fillers.

The second, the carbohydrate alcohol soluble free proteins, differ from the former type in that they are practically completely soluble in dilute alkali and substantially insoluble in aqueous alcohol solutions. Comprised principally of the glutelins and a small amount of globulins, they find use as a filler, as a component of phenolic resins, and a base in alkaline coating solutions.

The third and most important group constitutes the aqueous alcohol soluble prolamines, or zein. First isolated in 1821 from corn or *Zea mays* by Gorham, it has attracted more attention than any of the other proteins, due to its characteristic alcohol solubility. Its elementary composition is reported as: Carbon, 55.23%; Hydrogen, 7.26%; Nitrogen, 16.13%; Sulfur, 60%; Oxygen, 20.78%; a typical analysis of a commercially produced product being: Moisture, 8.0%; Protein, 87.5%; 80% alcohol soluble (dry basis), 90.0%; Ash, .4 to .5%; Oil, .4 to .6%.

It is a substantially white, odorless and tasteless amorphous solid, similar in many of its properties and characteristics to shellac, casein, and cellulose esters, being thermoplastic, having a high electric insulation value, resistant to heat, stable to light, and, while combustible, being non-inflammable. It has a molecular weight of 20,000; a specific gravity of 1.226; is amphoteric with an acid combining power of .00012 at pH 2.8 and has a base combining power of .00020 at pH 10.8; is insoluble in water, dilute acids, anhydrous alcohols, turpentine, esters, oils and fats, ethers, ketones, chlorinated solvents, petroleum and coal tar hydrocarbons, ammonia, borax, and sodium and potassium carbonates.

Aqueous alcohols, strong organic acid solutions, dilute ½% sodium and potassium hydroxide solutions, dilute ethylene diamine or mono ethanolamine solutions, liquid ammonia, molten phenol, cresol, petrex, rosin, and strong solutions of urea are very effective solvents. Zein affords an ideal base for plastic and organic solvents, and dilute aqueous alkaline coating solutions.

It is further compatible with many of the cellulose derivatives, plasticizers, synthetic and natural resins, and can be compounded to transparent, clear, glass-like, stable compounds, suitable for use in novelties, sheeting and coatings; such as are now found made from cellulose derivatives and natural and synthetic resins. Zein is relatively highly reactive, through which it offers a prospective base of possible new synthetic resins. It can also be hydrolyzed to many amino acids.

As these proteins constitute about 10% of the whole corn it can be seen that the potential available supply is large and is limited only by our corn production. Again the wet milling industry, through these proteins, particularly the prolamine "zein," brings to the chemist another new tool, to the farm a new prospective outlet for corn and to industry new products and economic values, thus bringing closer together the mutual interests of chemistry, farming, and industry.

# New Alloys for Acid Processing Equipment

*Fig. 1. The seven Hastelloy C shafts in the foreground are 3 in. in diameter for use in large autoclaves in the plant of a large chemical manufacturing concern.*

MUCH metallurgical research has been directed toward the development of new alloys with more desirable corrosion-resisting properties, and considerable headway has been gained in the battle against nitric and sulfuric acids. Quite recently commercial alloys have been developed which provide, for the first time, strength and shock-resistance comparable to steel, together with good resistance to the action of hydrochloric acid.

Prolonged investigations have established the resistance of certain nickel-molybdenum-iron alloys to hydrochloric acid in all concentrations at temperatures up to 160° F. (71° C.). It is not meant that these alloys are absolutely immune to attack by this acid. They represent, however, real progress toward controlling corrosion of equipment for use with hydrochloric acid.

This research has developed a nickel-molybdenum-iron alloy, known as Hastelloy A, particularly resistant to hydrochloric acid in any concentration and at temperatures up to 160° F. (71° C.), although the rate of attack naturally increases with the temperature. The alloy has high strength and good ductility and retains its strength at high temperatures. It can be forged and rolled into sheet and other simple shapes, and makes excellent, sound castings.

Although results of laboratory tests cannot be translated into directly comparable figures for commercial plant equipment, the data on inches penetration per month obtained in an extensive laboratory investigation are of interest. At room temperatures the loss of alloy in a 37 per cent. hydrochloric acid solution has been found to be 0.00003 in. penetration per month. At 158° F. (70° C.), the penetration of 37 per cent. hydrochloric acid is 0.002 in. per month. Little variation was found due to the strength of the acid.

Hastelloy A is also resistant to sulfuric acid of practically any concentration at temperatures up to 158° F. (70° C.) and to solutions of less than 50 per cent. concentration at temperatures up to the boiling point. It also satisfactorily resists acetic, formic and certain other acid solutions, salt spray and alkalies. However, its use is not recommended in the presence of hot or cold nitric acid or free chlorine.

Hastelloy A exhibits in the fully annealed condition an ultimate tensile strength of 110,000 to 120,000 lbs. per sq. in., a yield point of 47,000 to 52,000 lbs. per sq. in., an elongation of 30 to 48 per cent. in 2 inches, and a reduction of area of 35 to 54 per cent. Cold work hardens the alloy, an ultimate tensile strength of 150,000 lbs. per sq. in. being obtainable. It is also unusually strong at high temperatures, withstanding a continuous load of 1,500 lbs. per sq. in. at 1650° F. (900° C.) with a creep of less than 1 per cent. per year.

To overcome the effect of the strong oxidizing agents such as nitric acid, free chlorine, and acid solutions of ferric and cupric salts, the composition of Hastelloy A was modified by adding chromium. Besides being highly resistant to oxidizing agents, the resulting alloy of nickel, molybdenum, chromium, and iron, designated as Hastelloy C, is less capable of withstanding the action of hydrochloric acid but it is more resistant to sulfuric acid. It also stands up well in the presence of acetic, formic, sulfurous and phosphoric acids. Hastelloy C differs from Hastelloy A in that it cannot be mechanically worked either hot or cold on a commercial basis. However, this alloy makes excellent castings machinable at moderate cutting speeds. These castings exhibit the following physical properties: an ultimate strength of 55,000 to 79,000 lbs. per sq. in.; a yield point of 42,000 to 47,000 lbs. per sq. in.; an elongation of 3 to 11 per cent. in 2 inches; and a reduction of area of 5 to 15 per cent.

Hastelloy D, the third of this series, is composed of

nickel, silicon, copper, and aluminum, developed especially for resistance to hot and cold sulfuric acid. The loss of this material in a 25 per cent. sulfuric acid solution at room temperature is 0.00011 in. per month: the loss in boiling acid of this concentration, 0.00073 in. per month. For 60 per cent. acid, corresponding figures are 0.0000073 in. per month at room temperature and 0.00257 in. per month at the boiling point of the acid. Acetic, formic, and phosphoric and hydrochloric acids at moderate temperatures can be handled satisfactorily by this alloy. It is not resistant to nitric acid or free chlorine. Resistance of Hastelloy D to hydrochloric acid is not so high as that of Hastelloy A but still considerably above that of most commercial alloys. In a 10 per cent. hydrochloric acid solution at 158° F. (70° C.) it loses 0.00018 g. per sq. cm. per hour, a penetration of 0.0066 in. per month.

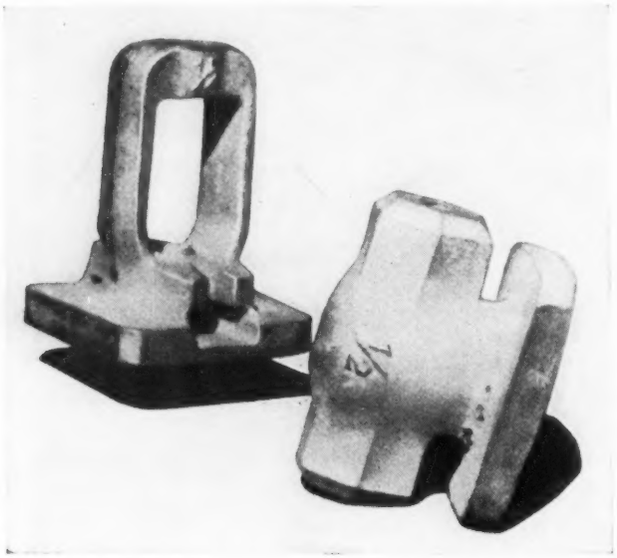


*Fig. 2. A ½-in. gate valve of Hastelloy A. Two of these have been in service handling 98 per cent. sulfuric acid for almost three years without showing appreciable corrosion.*

Hastelloy D can be used only in the cast form and can be machined only with difficulty. Simple operations are possible with superhard cutting tools, but grinding is necessary for most finishing operations. Transverse tests on a standard arbitration bar showed this alloy to have a breaking load of 5,000 lbs. with a deflection of 0.070 to 0.080 in.—values about five times those of commercial iron-silicon acid-resisting alloys. The alloy can be toughened by suitable heat-treatment without decreasing its corrosion-resistant properties.

All three Hastelloys are readily welded by the oxy-acetylene or electric arc methods. The latter process, accompanied by the proper heat-treatment, is preferred. In the case of Hastelloys A and C, to gain full corrosion resistance at the welds made by the oxy-acetylene process, a neutral flame is required since an excess acetylene flame decreases corrosion resistance of the alloy. An excess acetylene flame is recommended for Hastelloy D. Hastelloy welding rod has been used for surfacing gate valve wedges in refinery service and for similar applications where a corrosion-resistant surface is desired.

A few examples of applications will indicate the use of these alloys in chemical plants. Valves and valve fittings are one of the two most important applications. Figure 2 shows ½-inch gate valve castings of Hastelloy A, to handle 98 per cent. sulfuric acid solution at 98 to 120° F. These pipe valves have been in service almost three years. Cast pipes can be made of any one of these alloys and Hastelloy A can be furnished in welded tubing. A tank car vent of Hastelloy pipe and fittings is shown in Fig. 3.

A pressure vessel for handling hydrochloric acid has been completely fabricated of Hastelloy A sheet, 5/32 in. thick. This vessel was 7 ft. 6 in. in diameter and 9 ft. 3 in. deep over the hemispherical heads. Before use the tank was annealed at 1150° C. (2150° F.) and sand blasted. The agitator arms are also of Hastelloy A driven by a 3-h.p. motor. On top is a condenser of which the shell and tubes are all of Hastelloy A with steel flange backing rings. Other applications of the Hastelloys for corrosion-resistant service are agitator units, heating and cooling coils, pumps, and pump parts, condensers, blowpipes and steam pipes, pickling tanks, chlorinating equipment, etc. Hastelloy A is used for grids in thermionic vacuum tubes. A thermocouple protecting tube of Hastelloy C has been used with success at temperatures from 1,200 to 1,500° F. in sulfur-bearing gases containing 25 per cent. by volume of hydrofluoric acid gas. Yoke stick castings of Hastelloy A have been used in a 7 per cent. sulfuric acid solution at 180° F. for pickling steel rods and wire. A valve of cast Hastelloy D has proved successful for handling acid sludge containing 70 per cent. sulfuric acid at 125° F.

*Fig. 3. A tank car vent of Hastelloy A. A very corrosion-resistant alloy is required to withstand concentrated hydrochloric acid fumes.*

# Organic Chemicals from Coke-Oven Gas

***An Interpretation of the European Point of View by C. H. S. Tupholme***

COKE-OVEN gas represents a source of wealth, as yet largely unrevealed, if considered as a chemical raw material. The utilization of coke-oven gas has proceeded in a natural evolutionary manner. We have already passed through the stages of complete wastage when metallurgical coke was almost exclusively made in beehive ovens to an uneconomic utilization merely as a fuel for heating the ovens themselves. It has come to be universally realized that it is possible and profitable to pass coke-oven gas to distributing centers for ultimate consumption as fuel in the factory or home. But in the evolution of coke-oven gas utilization, this is not the end. The gas contains constituents too valuable to be merely burned to carbon dioxide and water. From its hydrogen and methane can be made so many valuable materials that it should be a matter of no great difficulty to strip these constituents and pass on the residual gas for distribution through city mains.

We propose to indicate the principal new processes available for the conversion of coke-oven gas constituents into motor fuels, fertilizers, organic chemicals, solvents, synthetic rubber, etc., but we would anticipate criticism by saying that some processes may be economically unsound in some districts though sound commercial propositions in other localities. Some processes described are proven chemical successes: others represent laboratory successes. But in every case the dollars and cents of the matter receive special consideration.

Cheap hydrogen is a fundamental requirement in the established process of synthetic ammonia making. It goes a long way in solving the economic problems of such processes as coal liquefaction or hydrogenation, synthetic methyl alcoho'-making, and the like. Therefore hydrogen from coke-oven gas is our first specific example because the project has already been proved upon the large scale. Cheaper hydrogen than can be made by any known method is being produced in immense quantities from coke-oven gas and used for making synthetic ammonia. The residual gas, consisting of methane to all intents and purposes, is generally passed on for domestic consumption. Some 70 per cent. of the heating value of the original gas remains in the stripped gas, which is if anything more valuable since it may average with a low C. V. gas to form a very suitable domestic supply. As hydrogen is at present the costliest single factor in synthetic ammonia production we have a first striking illustration of the economic desirability of "working up" coke-oven gas before general distribution.

In the process of extracting hydrogen from coke-oven gas by partial liquefaction, the ethylene and propylene constituents are readily obtained without extra cost. Ethylene is already being used in large amounts for the production of ethylene dichloride (a valuable solvent), ethylene chlorhydrin, ethylene glycol (a formidable competitor of glycerine for explosives making, in anti-freeze compounds and toilet preparations and a source of cellulose lacquer solvents) and ethyl alcohol. Similarly, propylene can be turned into iso-propyl alcohol, increasingly used for ethyl alcohol in perfumes, toilet requisites and the like, and in further chemical synthesis.

These are established processes largely worked by Union Carbide, the ethylene and propylene coming from the treatment of natural gas or from oil cracking still gases. On the other hand, the ethylene and propylene are, in a sense, automatically produced without cost when coke-oven gas is taken for hydrogen production.

A process which cannot be lightly dismissed is that whereby ethylene and acetylene (producible from coke-oven gas very cheaply, as indicated later) combine to form butadiene, an unsaturated hydrocarbon used by du Pont for the polymerization process in synthetic rubber production. It is early to speak of the ultimate possibilities of synthetic rubber, but faced with cheap natural rubber clearly the starting materials for synthetic-rubber-making will have to be low-cost materials. Coke-oven gas may provide such a cheap source of ethylene and acetylene.

Similarly, in the production of hydrogen from coke-oven gas, the benzol, its homologues and analogues are condensed in full yield, and again, in a sense, without extra cost for their liquefaction is incidental and unavoidable during the partial liquefaction progress of hydrogen extraction. The yield of benzol is greater than by any other known process except perhaps that using inorganic gel absorbents. If it is not desired to extract the hydrogen, the benzol can be won by the application of the inorganic gel absorbents. Much purer benzols, more readily and economically refined, are recovered from the gels which are capable of continuous cycles of absorption and recovery of benzol in situ.

In these examples of coke-oven gas utilization, with the exception of the last (in which benzol recovery as a specific operation by means of gel absorbents has been noted), the main process involved has been the partial liquefaction of the original gas. Here the hydrogen is left in the gaseous condition while ethylene, propylene, benzene, etc., are removed as condensed liquids. The residual gas, consisting mainly of methane with a small proportion of its homologues, contains many interesting possibilities. At the root of these stands the process for the thermal decomposition of

methane whereby acetylene, ethylene, ethane and higher saturated and unsaturated hydrocarbons are produced, as well as condensible hydrocarbonaceous products of value as fuels for internal combustion engines.

With the transformation of acetylene and ethylene we shall now deal, remarking in parenthesis that we shall merely mention the process by which a crude carbon black and hydrogen are obtained from methane by absolute decomposition, and the various methods which have been tried for the direct oxidation of methane to formaldehyde. These latter have been extensively investigated but yields are small, and as synthetic methyl alcohol can readily be made and oxidized almost quantitatively to formaldehyde, the direct oxidation of methane has become of less importance, at any rate for the time being.

Acetylene is an important product of thermal decomposition of methane, and can therefore be produced from coke-oven gas either before or after the hydrogen has been removed. In addition, it is claimed that as much as 25 per cent. of acetylene can be obtained from methane by electro-thermal decomposition. What then can be made from acetylene?

### Synthetic Acetic Acid Made from Acetylene

Immense quantities of synthetic acetic acid from acetylene have become one of the most important synthetic organic chemicals. By passing acetylene into an agitated solution of sulfuric acid containing mercuric oxide acetaldehyde is produced. By the catalytic oxidation of acetaldehyde, for instance, in the presence of manganous acetate, acetic acid is obtained and requires but simple distillation to produce the purest glacial grade. The process is well established and the product is driving "natural" acetic acid from the market.

At present the common source of the acetylene used is calcium carbide. From the following equation $CaC_2 + H_2O = C_aO + C_2H_2$ it is seen that, theoretically 64 ounces of carbide yield 22 cu. ft. of acetylene. Taking calcium carbide as usual to 80 per cent. pure, we find that about 250 lbs. produce 1000 cu. ft. of the required gas. Calcium carbide at $40 a ton means acetylene at $5 per 1000 cu. ft. These are rough figures, but what is significant is that at any cost in respect of acetylene, synthetic acetic acid and derived products are made in large quantities in economic competition with the same products made otherwise. If reasonable amounts of acetylene can be produced by the thermal or electro-thermal decomposition of methane, a very cheap supply of acetylene is forthcoming. The methane constituent of coke-oven gas cannot be priced at much above 25¢ per 1000 cu. ft. so that a ten per cent. yield of acetylene would be sufficient, especially in conjunction with the other products of decomposition which represent valuable commodities.

From synthetic acetic acid, acetone is readily and economically made by catalytic decomposition and this process too is now worked on a large scale. Acetone is more and more called for in the rapidly advancing cellulose acetate industry, for solvent purposes in connection with cellulose nitrate finishes, etc., and in the making of propellent explosives, blasting gelatins, etc.

From acetaldehyde already made in immense amounts from acetylene, as noted above, other organic chemicals such as aldol, croton aldehyde, butyl alcohol and so forth are produced. The amounts of these materials may vary according to demand, but they are technically feasible and competitive. From butyl alcohol and acetic acid results butyl acetate, while ethyl acetate can be made direct from acetaldehyde or via synthetic acetic acid and alcohol. Thus valuable solvents for nitrocellulose lacquers are available from acetylene, and therefore coke-oven gas, when the thermal decomposition process is economically applied.

Ethylene and propylene occur naturally in coke-oven gas and, as explained above, are readily extracted during the production of hydrogen from the gas. In addition, however, they form important constituents of the gas mixture resulting from the thermal decomposition of coke-oven gas itself or of the extracted methane.

In England ethyl alcohol is actually being produced from the ethylene of coke-oven gas but not generally. Similarly, isopropyl alcohol is made in quantity from the propylene existing in the gases coming from the cracking stills now so widespread in America. It is theoretically possible for coke-oven ethylene and propylene, whether normally existent in the gas or produced from the methane, to find use in the production of alcohols. But the chief source of ethylene from which the enormous amounts of ethylene glycol, etc., are being made today is natural gas. Ethylene is made from the methane constituent, for it does not exist itself in the gas in large amounts except in isolated cases. What can be wrought upon the methane of natural gas can be done with the methane of coke-oven gas. Thus we have the possibility of processing coke-oven methane to form ethylene, and this may be the starting point for many syntheses.

### Transformation of Ethylene into Ethylene Glycol

The most spectacular use of ethylene is, however, the transformation into ethylene glycol. This is accomplished with the aid of chlorine, the intermediate ethylene chlorhydrin being hydrolyzed to the glycol. Thousands of tons of this synthetic aliphatic chemical are made annually, and from it are made the glycol ethers which find favor as solvents for cellulose lacquers. Many new ethers have been made as well as diethylene glycol and its derivatives. Moreover, ethylene glycol itself has many uses.

During the thermal decomposition of methane, liquid hydrocarbons are produced simultaneously with ethylene, acetylene and hydrogen. Yields from coke-oven gas methane are small, it is true, and if these were the only products of reaction, the process, though interesting enough would be technically and economically unworkable. As these liquid hydrocarbons are formed simultaneously with ethylene, acetylene, etc., even small

yields may be worth extracting in a multi-byproduct recovery system. After all, only an extremely small amount of anthracene is won from coal tar; but as it is but one of many recoverable byproducts, its price is low. The parallel may be challenged, but it may suffice to illustrate the possibility of multi-byproduct recovery system.

Liquid fuels may be produced synthetically from carbon monoxide and hydrogen, but only if hydrogen can be made very cheaply. As stated above, hydrogen from coke-oven gas is the cheapest anywhere, but this does not represent finality. The methane hydrocarbons of coke-oven gas can be cracked to form much more hydrogen than is present even in the original gas and it has been found possible to make from three to four cubic feet of hydrogen from a cubic foot of coke-oven gas. With such cheap hydrogen available, together with the mixture of carbon monoxide and hydrogen present in the relatively cheap water gas, the field of practical synthetic motor fuel production is extended as shown by recent developments in Germany. Much research has been made in this direction, but the cheapness of gasoline today blocks technical production of synthetic motor fuels. A comparatively slight rise in the gasoline price may be sufficient to alter matters considerably, particularly if abundant supplies of very cheap hydrogen are available.

Lest anyone should dismiss the chemical potentialities of coke-oven gas as the vain imaginings of a theoretical chemist, let us remember the time—not so very long ago—when coal tar was just coal tar and worth burning at the best. But more important than any parallels, is the proved possibility of many of the processes involved in the syntheses of these chemicals.

Let us summarize these proven processes and some of those which await only economic thermal or electro-thermal decomposition of coke-oven gas:—

(1) The cheapest known hydrogen is already made in large amounts from coke-oven gas. It is possible to extract all the hydrogen and to leave extremely abundant supplies of a high C. V. gas for public distribution.

(2) At the same time, full yields of benzol are obtained at almost no cost, since the hydrogen—cheap as it is—bears the working costs of the partial liquefaction process.

(3) Similarly, the ethylene and propylene in coke-oven gas are available at practically no cost for the same reason. These gases are now used for the production of ethylene glycol, ethylene dichloride, isopropyl alcohol, etc.

(4) If coke-oven gas is utilized completely for chemical production, thermal and electro-thermal decomposition of the methane hydrocarbons furnish more ethylene as well as acetylene and liquid fuels.

(5) Acetylene can be transformed into acetaldehyde, acetic acid, acetone, ethyl acetate and other materials by processes which, in themselves, are thoroughly worked out.

# Names of the Month—

## A Current Supplement to the Chemical Who's Who

**GULICK, Charles P.,** pres., Nat'l. Oil Prods. Co.; b- Newark, 21 May 1885; mar. Ruth Nye, Bloomfield, N. J., 15 June 1910, 3 sons; educat. H. S., Home study in chem. under private tutorship; Nat'l. Oil & Supply Co., salesman 1904-05, sec., treas. 1905-07; Nat'l. Red Oil & Soap Co., treas. 1907-12; Nat'l. Oil Prods. Co., treas. 1912-32, pres. 1932 to date. Address: Harrison, N. J.

**KENDALL, Paul,** gen. mgr., sec., treas., Sharples Solvents Corp.; b- Watertown, Mass., 17 Oct. 1894; mar. Leonora P. Walz, Overbrook, Pa., 29 Apr. 1924, 1 son, 1 dau.; educat. Harvard, A.B. 1920. Crunden Martin Mfg. Co., treas. 1921-27; Sharples Solvents Corp., 1927 to date. Clubs: Merion Cricket, Sunnybrook Golf, Harvard (Boston). Hobbies: meteorology, gardening, golf. Address: 23rd & Westmoreland Sts., Phila., Pa.

**HIXSON, Arthur Warren,** prof. chem. engr., Columbia Univ.; b- Mifflinburg, Pa., 7 July 1880; mar. Edetha M. Washburn, Ottawa, Kans., 17 June 1907, 1 son, 1 dau.; educat. Kansas, A.B. 1907, M.S. 1911; Columbia, Ph.D. 1918; Univ. Ill., grad. wk. Detroit Copper Min. Co., assayer, metall. 1906-08; Ill. State Agric. Exp. Sta., chem. 1908-09; Ia. State Geol. Survey, chem. engr., State Univ. Ia., hd. dept. min. eng. 1909-12; asst. prof. indus. chem. 1912-15; assoc. prof. 1915-17; Western Constr. Co., v-p., 1912-15; Columbia, assoc. prof. chem. eng. 1919-27, prof. 1927 to date; Fleischmann Yeast Co. consult. chem. engr., 1922-27; U. S. A. Ordnance Dept., chg. prod., chem. engr. 1918-19; War Claims Bd., tech. adviser 1919-21; Leonia, N. J., Town Planning Bd., chmn. 1924 to date; Schl. Bd., memb. 1925-32. Author many scientific papers, 20 pats. Res. on chem. of asphalts, carvacrol derivatives, thiorndigoid dyes, titanium pigments, bakers' yeast, solvent ref. lubric. oils, refrigerants, unit operations chem. engr. Memb. A.C.S.; A.I.Ch.E.; Electrochem. Soc.; Soc. Chem. Ind.; Sigma Xi; Phi Lambda Upsilon; Tau Beta Pi. Clubs: Chemists' (N. Y.); Faculty (Columbia); Englewood Golf. Hobbies: gardening, town planning, soilless culture of plants, golf. Address: Chandler Lab., Columbia Univ., N. Y. City.

**PICKENS, Russell M.,** chem. dir., Rainier Pulp & Paper Co.; b- Lincoln, Neb., 17 Apr. 1898; mar. Thelma Miles, Seattle, 21 Sept. 1935; educat. Mont. State Coll., B.S. 1920; Ia State, M.S., 1922, Ph.D. 1925. DuPont Rayon & Cellophane Cos., res. chem., chem. dir., 1925-30; Rainier Pulp & Paper Co., chem. dir., 1930 to date. Inf. Officer's Train. Sch., 1918. Res. on mfg. rayon, Cellophane and pulps for same. Memb. Phi Kappa Phi; Sigma Xi; A.C.S.; A.I.Ch.E. Clubs: Wash. Ath.; Tacoma Golf & Country. Address: Shelton, Wash.

**TOUR, Sam,** v-p. chg. eng., Lucius Pitkin, Inc.; b- Colorado Springs, 27 July 1895; 1 son; educat. Univ. Colo., B.S. (Ch.E.) Spec. hon. 1916; Univ. Mich., M.Sc. 1917. Univ. Mich., asst. in chem. eng. 1916-17; U. S. A., Ordnance Dept. 1917-19, Tech. staff of Chf. of Ordnance 1919-21; Doehler Die Casting Co., metallurgist 1921-28; consult. metallurgist and engr. 1928-29; Lucius Pitkin, Inc., v-p. in chg. eng. 1929 to date; Buffalo Test. Labs., v-p. 1930 to date. Author numerous papers metall. subjs. Memb. Soc. Auto. Engrs.; Amer. Foundrymen's Assn.; A.I.Ch.E.; A.I.M. & M.E.; Assn. Consult. Chem. & Chem. Engrs.; A.S.T.M.; Amer. Soc. Mets. Address: 47 Fulton St., N. Y. City.

# Formaldehyde in the Textile Industry

## *By "Chemitex"*

THE Tootal technique of impregnating textiles with resinous condensations has developed rapidly in the last few years. By its means cotton may be made permanently crease-resisting by treatment with urea-formaldehyde followed by a short period of heating. The effect is not affected by washing nor does it detract from the desirable qualities of the fiber.

### Increasing Use of Formaldehyde in Textiles

The application of formaldehyde to textiles is not new, but it is growing. Thus, the fastness of dyes on cotton is improved by treatment after dyeing with a dilute aqueous solution of formaldehyde. Dyes improved by this process are those containing OH and $NH_2$ groups in the molecule. Presumably the formaldehyde condenses with the dye substance to give a more inert derivative in the interstices of the fiber which better resists the action of light and the agencies of wear and exposure.

The treatment of wool and silk with formaldehyde causes increased resistance to chemical and alkaline processes. Wool, for example, is very sensitive towards soda. The fiber becomes brittle and natureless, and a little yellow. On this account, the washing of woollen goods with strong soap and soda liquors risks damage to the fabrics and is to be avoided. Previous treatment with formaldehyde renders wool able to withstand alkaline baths with less of this risk. Again, wool hardened by formaldehyde is more resistant to acids and is consequently stronger in the presence of dye liquors and carbonizing processes.

Cotton treated with formaldehyde is said to be more resistant to alkalies and to the mercerizing process. Formaldehyde also diminishes the affinity of cotton for direct dyes. Rayon is stated to be stronger after an immersion in dilute aqueous formaldehyde followed by drying at 100° C.

The introduction of synthetic resins in textile technology is a new departure. The earliest patents, British Patents 291,473, 291,474 and 304,900 granted to Tootal, Broadhurst & Lee, Ltd., about 1932 dealt with the impregnation of cotton with about 15 per cent. urea-formaldehyde to render the fiber creaseless. The process is now well established on a commercial scale both in England and the United States.

No wonder other textile firms have experimented with resins to share in the new prosperity and the patents are numerous. Let us consider briefly a few recent modifications and developments of textile impregnation with urea-formaldehyde resins.

A patent of 1935 covers production of anti-crease finishes on textiles by treatment with ammonium sulphocyanide and sulphide in combination with formaldehyde. Elastic resins are said to be formed which are, however, quite different from those obtained from urea and formaldehyde.

The Calico Printers Association has one or two promising patents. In one, they apply urea and formaldehyde to viscose rayon to increase weight by 20 per cent. without detracting from their otherwise full and soft handle. In another recent patent, they report that resin condensations on textiles behave in much the same way as mordants for dyes. Insoluble themselves, they retain the dye and prevent its removal or spreading in the washing operation. Dyes such as Chlorazol Fast Red K may be simply applied to the cotton fabric by immersion. When afterwards, the fabric is treated with urea and formaldehyde, an insoluble resin is formed and the dye then becomes permanently fixed. The resulting dyed material may be boiled in soap without losing its color. Normally, such drastic treatment is out of the question.

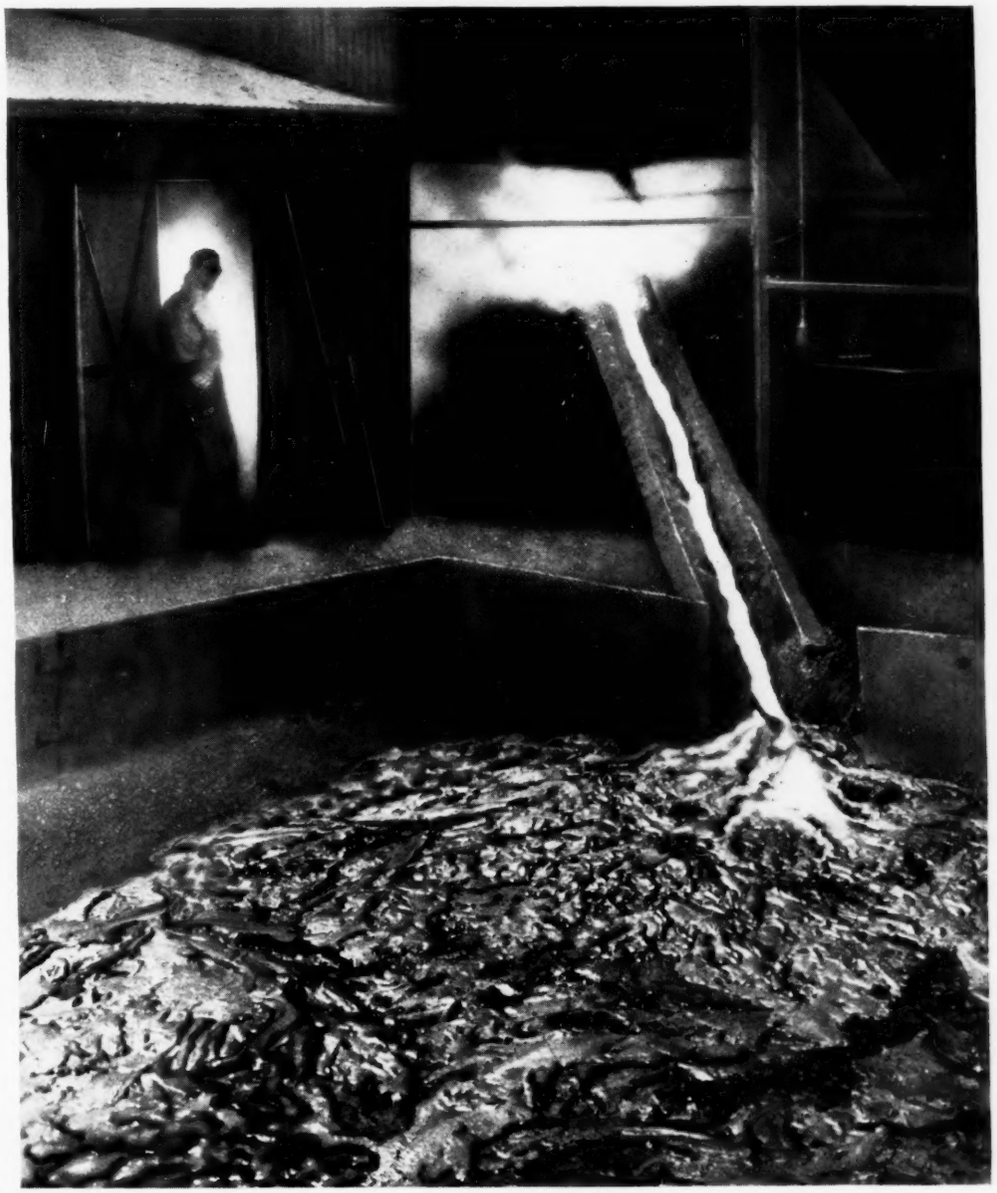
### Many Patents Cite Use of Formaldehyde

The resin-impregnated-textile patents which have appeared during the last few months indicate that formaldehyde is the most important item in the whole procedure. Some inventors propose alternative compounds to urea for condensing with the formaldehyde; but in every patent formaldehyde is mentioned somewhere. In fact, it appears that formaldehyde alone is capable of producing anti-crease effects on cotton provided a suitable catalyst is employed. For example, in British Patent 455,472 to Heberlein & Co., Switzerland, cotton is treated in a bath containing 60 liters of 38 per cent. formaldehyde, 1.2 kilograms of potash alum (the catalyst), made up to 100 liters with water. After impregnation for 20 minutes at room temperature, the cotton is dried on a frame and finally subjected to a temperature of 140° C. for 4 minutes.

The inventors state that the material becomes creaseless and still very soft in handle, the effect being permanent enough to withstand soap washing.

In other recent patents fabrics are treated with formaldehyde and acid catalysts in order to render permanent certain mechanical effects and finishes previously applied.

# Plant Operation and Administration



View of a furnace in American Agricultural Chemical plant in which elemental phosphorus is produced by an electric-furnace process developed by company's engineers.

## A Digest of New Methods and Equipment for Chemical Makers

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# Safer Method for Producing Titanium Tetrachloride

A new process for the manufacture of titanium tetrachloride, claimed to be safer, cheaper and more economic than the processes hitherto employed, has been worked out by Dr. G. A. Favre, of the Société des Produits Chimiques de Saint-Bueil, and forms the subject-matter of English Patent 458,892 of 1936 that has recently been granted to this last-mentioned company.

The prior processes referred to in the specification, and all of which are stated to be capable of giving rise to the production of carbon oxychloride (phosgene), besides giving a somewhat impure tetrachloride, are the following:

A stream of dry chlorine is caused to pass over titanium oxides in presence of carbon and various catalysts. This process described and studied by Pierre, Demoly, Trillat, Favre, has been abandoned, mainly because titanium tetrachloride can only be separated from carbon chlorides and oxychlorides by means of very costly subsequent treatments.

It has been proposed to treat, by means of chlorine, ferro-titanium, titanium carbide, titanium pig irons. But to the inconvenience of the prohibitive price of these compounds is to be added the fact that secondary reactions on the carbides of ferro-alloys cannot be avoided and prevent the production of pure titanium chloride. Treatment of ilmenite by diluted mixtures of chlorine and carbon monoxide and the action of sulfur chlorides on titanic acid do not, either, allow the direct production of pure titanium tetrachloride. Same is true concerning the experiments effected by aluminothermy, followed by a chlorination of ilmenites into titanium chloride, by means of vapors of carbon chloride, chloroform or carbonyl chloride.

The new process is characterized by the fact that mixtures of titanium-iron-copper heated to a temperature higher than 150° C., are subjected to chlorination, so as to initiate an exothermic reaction. In this reaction copper is first converted into cuprous-cupric-chloride, and this latter body immediately yields its chlorine to the titanium to form titanium tetrachloride which escapes in the form of gas. At the same time, the iron forms ferric chloride which the copper reduces to ferrous chloride with production of cuprous-cupric-chloride, which again yields its chlorine to the titanium.

For carrying out the process, it appears advantageous to use the mixture copper-iron-titanium in the form of an alloy sium, and the invention covers the application of alloys and to initiate the reactions at a temperature of about 250° C. These alloys can contain aluminum and magnesium, and the invention covers the application of alloys of copper-magnesium-aluminum, found abundantly on the market. These alloys to which copper is added, if necessary, by any suitable treatment, are brought up to the content of iron and titanium by the addition of ilmenite and by a cupro-alumino thermic treatment similar to aluminothermy.

The direct preparation of the alloy, copper-iron-titanium, is readily effected by electro-silicothermy by adding the required proportion of copper to the ilmenite. The proportion of copper in the alloy determines the degree of purity of the titanium tetrachloride. The presence of silicon, tin and arsenic gives rise to the formation of silicon tetrachloride, of tin tetrachloride, or of arsenic chloride in admixture with the titanium tetrachloride. *The Chemical Trade Journal*, British, Feb. 5, '37, p.115.

## Preparation of Luminescent Zinc Sulfide

Luminescent zinc sulfide is prepared from zinc salt solutions which have been purified from heavy metal impurities by precipitation with a little hydrogen sulfide under conditions preventing separation of zinc sulfide. This can be effected by adding enough sulfuric to a solution of zinc ammonium sulfate to give a normal acid solution. This is followed by addition of hydrogen sulfide in quantity sufficient to give a concentration of 0.004 mol. per liter. After 10 to 15 minutes the sulfuric is neutralized by gradual addition of progressively decreasing quantities of ammonia at a rate sufficient to reduce the acidity by one-half every 5 minutes. *Jour. Prikl. Chim.*, 1936, No. 4, p670, and digested in *The Chemical Age*, British, March 20th, p259.

## Strontium Carbonate from the Sulfate

Strontium carbonate can be produced from the sulfate by the action of ammonium carbonate. The speed of the reaction depends mainly on the concentration of the solution in ammonium sulfate, quantity of water present, temperature, and pressure, but that it is only slightly influenced by the concentration of ammonium carbonate. The most satisfactory conditions for the conversion: (1) reaction mass should be sufficiently dilute, 5 parts by weight of water to one part of celestine or precipitated strontium sulfate; (2) temperature should be between 40° and 50° C.; (3) content of the solution in ammonium sulfate should not be higher than 15% in the case of celestine, or than 25% in the case of precipitated strontium sulfate; (4) pressures used should be higher than atmospheric; (5) amount of ammonium carbonate should be only slightly higher than the theoretical quantity. G. Gallo, *Ann. Chim. Appl.*, '36, No. 3, p109.

## Conversion of Potassium Chloride to the Nitrate

A study has been made of the factors influencing the conversion of potassium chloride to potassium nitrate by the passage of nitrogen peroxide-air-nitrogen mixtures, derived from the oxidation of ammonia with air and ranging in composition from 5.2 to 11.0% nitrogen dioxide by volume, through beds of moistened potassium chloride.

Under comparable conditions of particle size, moisture content of the chloride, diameter and depth of the bed, and rate of flow of the nitrogen peroxide the more concentrated peroxide mixtures reacted more rapidly but less completely in a single pass than the less concentrated mixtures.

Stepwise countercurrent nitration, with oxidation chambers between successive beds, indicated complete reaction of an 8% peroxide mixture when half of the nitrogen oxides were converted to potassium nitrate and the other half to nitrosyl chloride. *Industrial & Engineering Chemistry*, March, '37, p333.

## Fully Automatic Electrolytic-Alkali Plant

A description of a new Danish electrolytic-alkali plant is given by J. Eilertsen, *Chimie et Industrie*, February. The mercury cell process is employed, and the plant is designed for the annual production of 700 tons of caustic soda and 750 tons of caustic potash. The plant is fully automatic, the brine solution being circulated continuously and only renewed after 9 or 10 months, owing to the accumulation of chlorates and other impurities. Plant recovers part of its chlorine as liquid chlorine, and uses the balance for the manufacture of bleaching powder and synthetic hydrochloric acid.

## Froth Flotation of Talc

At present, most "pure" talc is imported from France, Spain, and Italy, and a satisfactory domestic source is in growing demand. Certain talcs in northern New York are mixtures of two components of nonuniform proportions. An investigation is now in progress by the Nonmetals Division of the Bureau of Mines in cooperation with the industry to separate the "tremolite" component from the "talc" and to standardize on uniform proportions of these two components. The investigation has already shown that the talc is readily separated by froth flotation. It differs, however, from the usual froth-flotation problem, in that the talc is readily floated. Whereas, the usual problem is to find a suitable reagent to float the one component, the difficulty here is to avoid flotation of the tremolite. Considerable progress is being made, and it is hoped that the results will be ready for publication within the next few months.

# Anhydrous Ferric Sulfate from Pyrites Cinders

English Patent 459,436 (1937), granted to Monsanto Chemical, in its published specifications discloses several of the details of a process for the manufacture of anhydrous ferric sulfate from pyrites cinders.

In its broadest aspects, states the specification, the process may be applied to practically any solution of ferric sulfate which does not already contain substantial amounts of insoluble compounds; thus it may be applied to solutions of ferric sulfate obtained by the oxidation of ferrous sulfates. For reasons of economy, however, it is preferred to use a solution of ferric sulfate obtained by treating ferric oxide obtained, for example, by the roasting of pyrites in the manufacture of sulfuric acid. A convenient method of forming such solutions of ferric sulfates is to treat the ferric oxide or burnt pyrites in considerable excess of that theoretically required, for example, an excess of 20% or 25%, with sulfuric acid of approximately 35°-40° Bé. During the reaction there is considerable evaporation of water, and acid salts will tend to crystallize or precipitate. Such tendency may be corrected by the addition of a suitable amount of water. After approximately 27 to 50% of the acid has combined with iron oxide, this tendency of the acid salts to precipitate ceases and only neutral salts can separate from concentrated solutions. It then becomes quite possible to concentrate the solution by boiling at normal or under reduced pressures. Preferably a considerable excess of burnt pyrites is initially introduced to speed up the reaction and effect substantially complete removal of the sulfuric acid within a reasonable period. The excess, together with silicates or other insoluble material, is removed after completion of the reaction by decantation or filtration.

A solution of ferric sulfate prepared as described, if subjected to complete drying and dehydration in the ordinary manner by direct heating to a temperature sufficiently high to remove all the water present, would be converted, at least to a considerable degree, into insoluble products (basic sulfates) which would be unsuitable for many commercial purposes. This undesirable effect is obviated by the present invention which comprises converting the solution into the dry and solid form of the sulfate containing water of crystallization by treating the solution with anhydrous ferric sulfate in an amount sufficient to remove substantially all the water of solution under conditions of temperature sufficiently moderate and/or conditions of acidity to prevent the formation of a material quantity of insoluble products, and then expelling the water of crystallization.

The following is a specific example given in the specification of conditions existing during the drying of ferric sulfates in actual practice.

Pulverulent anhydrous ferric sulfate is fed continuously into an inclined rotating mixing drum which is arranged to discharge continuously. The hot ferric sulfate solution is likewise fed into the drum continuously and at a regulated rate with respect to the rate at which the anhydrous product is supplied. The ferric sulfate solution should be as concentrated as possible in order to gain the greatest output and to reduce the amount of anhydrous product required.

In a mixer having a capacity of 1,700 lbs. of product and rotating at 18 r.p.m., it is possible to produce 415 lbs. of relatively uniform granular product per hour (calculated on an anhydrous basis) by feeding 1,100 lbs. of anhydrous ferric sulfate and 850 lbs. of ferric sulfate solution of 58° Bé. (equivalent to a content of 49% of anhydrous ferric sulfate and 46% of water).

Product may be dehydrated by standard methods. One such method consists in causing the material to flow through a rotary kiln in contact with combustion gases. *The Chemical Trade Journal*, British, March 12th, p230.

## Gasoline Inhibitors Discussed

The desirable properties of a commercial inhibitor are high potency in relation to cost, ease of solubility in gasoline, insolubility in water and dilute caustic soda, no color depreciation when added to gasoline and sufficient volatility to leave no deposit when the gasoline evaporates.

Inhibitors are successfully employed in doctor sweetened gasolines without further refining, and in acid treated and clay treated gasolines to increase the stability and to reduce the severity of refining. The most reliable test methods of predicting storage stability of gasolines are induction period and copper dish gum. Examples are given of the successful application of inhibitors to commercial gasolines from important oil producing fields in the United States and other countries. *The Oil & Gas Journal*, March 25th, p113, "Antioxidants as Stabilizers for Cracked Motor Fuels," by Dryer, Morrell, Egloff.

## Production and Research Chemists

I would say that one of the greatest differences between production and research is what I term the time factor. It follows, therefore, that the production chemist must necessarily have a more lively appreciation of the time factor than the research chemist. In other words, production has to be run to a timetable and to produce concrete results.

On the research side time is not the essential factor, while the research chemist is given more time to think. A production chemist must think and act rapidly in case of an emergency or unexpected breakdown of a process in a way in which a research chemist is never expected to do. A production chemist must have complete confidence in himself in addition to technical knowledge. I have seen men of excellent qualifications fail in production because of lack of confidence and nerve when things have gone wrong. The rough and tumble of the production side of industry is no place for a temperamental nervous chemist, whereas he may be brilliant in the cloisters of a research laboratory. C. M. Whittaker, *Chemistry & Industry*, March 13th, p251.

## Zinc Orthosilicate For Television Screens

Luminescent zinc orthosilicate to be used in television screens is made by triturating zinc oxide and silica in water in the presence of an activator (a manganese salt) and calcining the mixture. Success depends upon the use of extremely pure material, the "chemically pure" materials of commerce being unsatisfactory. The optimum temperature of calcination is 1200° C. and the proportion of manganese in the final product should be about 1%. *The Chemical Age*, British, March 13th, p239.

## Air Conditioning For Laboratories

The modern research laboratory and the general equipment making for the maximum of efficiency, are discussed by P. Lecomte de Noüy in the January issue of *Chimie et Industrie*. Air conditioning throughout the year is regarded as the prime requirement.

## Manufacture of Anhydrous Sodium Sulfide

A method for the production of practically pure anhydrous sodium sulfide which is claimed by the N. V. Stikstofbindings Industrie Nederland in a recent German patent consists in treating sodium carbonate, with or without admixed caustic soda, at a temperature between 600° and 850° by hydrogen sulfide or carbon oxysulfide, diluted with hydrogen and/or carbon monoxide, and also an inert gas (nitrogen) or reducing gas (methane). Degree of dilution of the sulfur gases by the hydrogen or carbon monoxide should be sufficient to prevent the formation of sodium hydrosulfide or sodium polysulfide, and the working temperature should be high enough to assure that the dissociation pressure of these two last-mentioned compounds if formed is at least one atmosphere. Concentration of the reducing gases should be sufficiently high to prevent the formation of sodium sulfate or other oxygenated compounds. In an example, it is stated that by passing a mixture of 1:3 parts of hydrogen sul-

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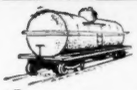

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fide to 1:9 parts of hydrogen over granules of sodium carbonate at 650° C., practically complete conversion of the hydrogen sulfide is obtained, the sodium sulfide produced being of a purity of 99% $Na_2S$. *The Chemical Trade Journal*, British, Mar. 5th.

## Acetylene From Methane

Acetylene is made by heating a mixture of methane and hydrogen to above 1000° C. for a period between 0.1 and 0.005 second. At reaction temperatures up to 1300° C. and above 1500° C., the proportion of hydrogen in the mixture may be any proportion between 75 and 90%, while at reaction temperatures between 1300° C. and 1500° C., the maximum permissible proportion of hydrogen varies regularly from 90% at 1500° C. to 80% at 1300° C. Products should be rapidly cooled and this may be effected, at least in part, by heat-exchange with fresh gas mixture. Acetylene may be recovered from the products by means of a solvent such as acetone. Process may be effected in tubes of refractory material, such as silica or carborundum, or in apparatus comprising refractory tubes arranged to form annular reaction spaces, as described in British Specification 440,432, or in refractory tubes having solid cores. An example is given in which a mixture containing methane 20 and hydrogen 80% is passed through a silica tube heated to 1500° C. English Patent 458,160 ('35) controlled by British Celanese Ltd.

## Chlorbutadiene Synthesis

Chlorbutadiene is made by passing gases containing vinyl-acetylene (which may be obtained by passing electro-arc acetylene over a solid catalyst containing a cuprous compound), together with hydrogen chloride over active carbon in the presence of halogen compounds of base metals of the second or fourth groups of the periodic system, such as mercuric and mercurous chlorides, bromides and iodides, and lead, cadmium, zinc, and stannous chlorides. The halides may be mixed with metallic mercury, and may be made in situ by charging the active carbon with the free metals. The reaction may be effected at 50-200° C. in the dry state or in presence of steam. Instead of hydrogen chloride, substances liberating it may be used, such as a mixture of phosgene and steam. Examples describe the use of active carbon containing calomel, metallic mercury, cadmium chloride and lead chloride respectively. Dilute vinyl-acetylene is used in each case. British Patent 458,100 ('35) and controlled by the German I. G.

## New Source of Lithium

An increasing demand for lithium compounds has been noted during the last few years, yet the supply of the mineral heretofore used as the source of lithium—amblygonite (a lithium alumino-phosphate)—is becoming increasingly uncertain. When this mineral fails to meet the demand, spodumene, a lithium alumino-silicate of "feldspathoid" behavior which occurs in large amounts in South Dakota and North Carolina, may serve as the next most suitable source.

### Separation With Air or Screening

One of the most spectacular discoveries of the year is the finding by the Bureau of Mines that this lithium feldspar, spodumene, in passing to its high temperature or "beta" form, is so expanded and weakened that it can be rubbed down to a powder and separated from gangue minerals by air separating or screening methods. This is true even on lumps of ore as large as one's head. It will permit concentration of low-grade ores not previously regarded as economic and provide a supply of cheap concentrate for the growing and promising lithium chloride, lithium hydroxide, and lithium carbonate industry. Such a product is also expected to be of value in making high-lithium glass cheaply, thereby obtaining glass of increased toughness, especially for shapes that can be cast directly.

Another method for the recovery of lithium from spodumene has been developed by the Bureau. By adapting the chloride volatilization process, it was found possible to extract lithium in the form of chloride from a spodumene concentrate. Limestone and calcium chloride are mixed with the spodumene and the mixture heated in a rotary kiln to at least 1100° C., permitting 95 to 98% volatilization of the lithium. A Cottrell precipitator will catch the lithium chloride fume from the partly cooled gases. The residue, if fired to clinkering temperature, is a white Portland cement. This work on making low-grade spodumene ores available to the lithium industry is now complete and will be published shortly as a Report of Investigations under the title, "Chloride Volatilization of Lithium from Spodumene," by Foster Fraas and O. C. Ralston.

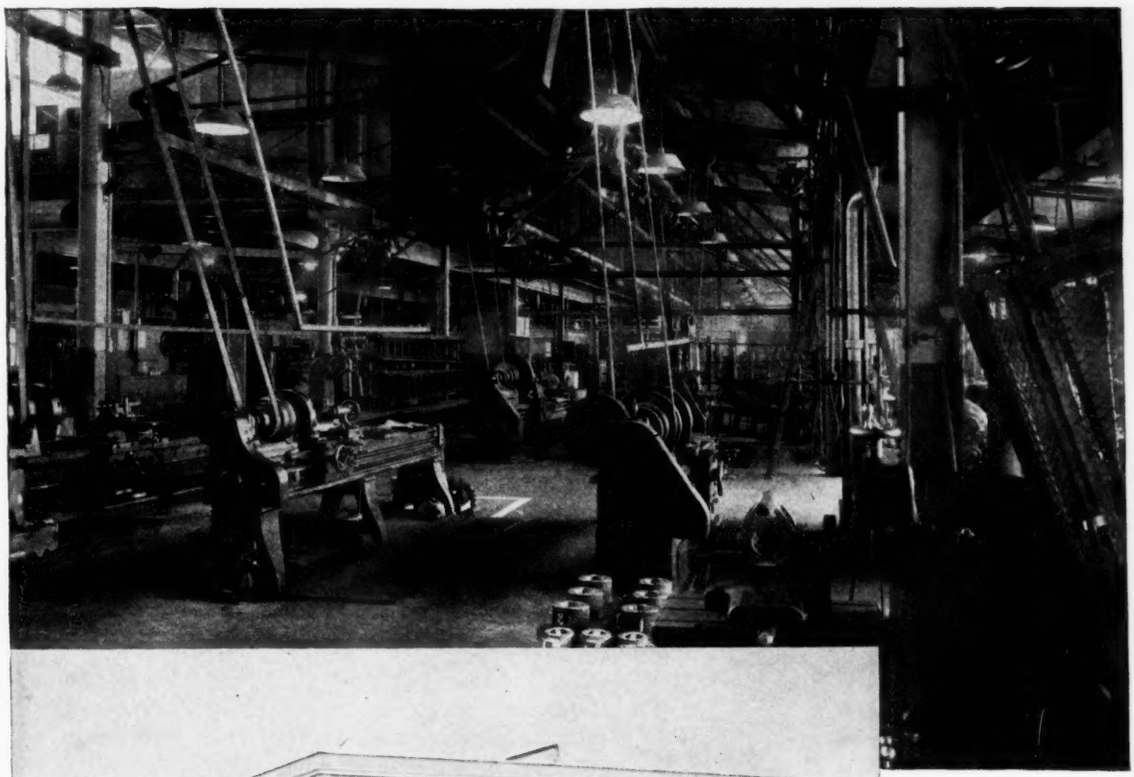
## Causes of "Caustic Embrittlement"

Since "caustic embrittlement" has long been regarded as a cause of boiler-steel cracking, numerous empirical preventatives have been suggested. The Bureau of Mines has now determined that this action does not take place unless certain amounts of silica are also dissolved in the caustic boiler water. This finding was of outstanding effect in helping explain previously puzzling contradictions in boiler failures and helping to extend the study of mineral constituents of the water. Wide attention has been given to these findings and enthusiastic cooperation from the Boiler Feedwater Studies Subcommittee of the American Society of Mechanical Engineers has resulted. This subcommittee raised a 2-year fund by subscription to continue the highly promising lead reported last year, namely, that silica dissolved in a caustic boiler water is necessary to cause the steel to crack. Conditions for augmenting and for diminishing this cracking have been studied. Certain oxidizing agents inhibit it, especially the presence of sodium chromate. It has also been found that lignin and certain classes of tannins can inhibit this effect. On the other hand, not only sodium silicate in the caustic boiler water but also dissolved titanium oxide, germanium oxide, and antimony oxides have been found to contribute to cracking. The nature of the cracks has been definitely shown to be intercrystalline, and, in the case of caustic boiler water, cracks could only be produced in steel under stress. However, in a sodium nitrate solution it was found possible to bring about the same cracking on steel which was not under active stress but had merely been cold-worked. Sodium nitrate solutions, if pure, cause no such intercrystalline cracking, but if a tiny amount of soluble manganese salt is present, the steel actually falls apart in a few days. It took over 2 years to learn how to produce the cracking, and now that it can be produced at will very active research is in progress on a wide variety of ways to mitigate the trouble. Results to date in the work by the Bureau indicate that caustic solutions alone do not embrittle steel. Although silica usually is the troublesome component, it has been found that titanium dioxide will result in cracking under similar conditions.

## Production of Dehydrating Salts

In a German process for the production of dehydrating salts aqueous melts of salts or concentrated solutions of salts other than magnesium sulfate, are wholly or partially dehydrated by atomizing the salt melts or solutions and treating them with superheated steam. Except that the temperature of the superheated steam may be allowed to fall to 120° C. during the dehydration, the process is carried out in the manner described in the parent specification. In examples: (1) Fused Glauber's salt at 110—120° C. is atomized through nozzles into a tower and treated with a counter-flow of superheated steam entering at 400° C. and leaving at 150° C.; (2) fused Epsom salt at 120° C. is similarly atomized and dehydrated with steam entering at 550° C. and leaving at 200° C.; (3) when treating fused magnesium chloride hexahydrate, the steam may be used at 250° C. and be cooled to 120° C.; (4) a hot concentrated solution of ferrous sulfate may be atomized at 110—120° C., and be treated with steam entering at 200° C. and leaving at 120° C. The superheated steam may be used at atmospheric or higher or lower pressures as desired. Metalleges Akt.-Ges., Frankfort-on-Main, is the owner of the patents.

# NERVE CENTER



**So many different types of equipment are required in the production of Calco's hundreds of dyes and chemicals that this entire building was designed solely to assemble and install almost every conceivable type of chemical tool. This includes autoclaves, nitrators, stills, kettles and the innumerable special technical articles that are daily required by Calco's many different departments.**

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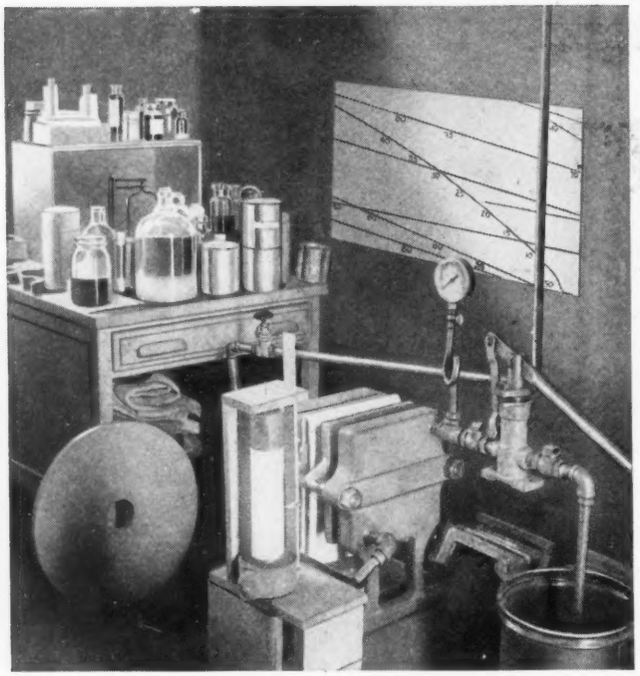
# FILTRATION?



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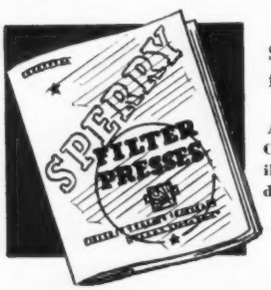


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# *New Equipment*

### Laboratory Shelf Dryer

With the No. 51 Laboratory Shelf Dryer the same results are obtainable as with large plant size dryers. The laboratory size has every feature of the larger industrial units. This apparatus is also designed so that hot water can be used as the heating medium instead of steam. The necessary auxiliaries for hot water heating can be supplied. Drying trays of proper size made of vitreous enamel, stainless steel, monel metal, galvanized iron and Pyrex glass can be furnished also.

The dryer can be supplied with either the Stokes 146-C High Vacuum Pump as shown or, for the general work and vacuums up to 29 inches, with a reciprocating type of vacuum pump.

### Marketing Galusha Gas Generator

Wellman Engineering, Cleveland, has acquired exclusive right and license under the U. S. Patents of Albert L. Galusha to manufacture and sell within and throughout the U. S. and its possessions the Galusha gas generator which produces a clean, high-grade, industrial gas from small anthracite coal, or coke-breeze, at a cost considerably below figures hitherto regarded as the minimum. This generator provides a uniformly clean, and dependable gaseous fuel, since the fuels used do not yield tar, and is therefore particularly adapted to industrial heating operations in which the quality of the product requires care to avoid discoloration, scaling, pitting or spotting.

### Electro-Magnetic Vibrating Screen

Allis-Chalmers Mfg. Co., Milwaukee, Wis., announces putting on the market a positive electro-magnetic vibrating screen using an entirely new principle in which standard alternating current may be used without resorting to auxiliary equipment such as motor generator sets. A new type of electro-magnetic vibrating motor, applied mechanically to the screen, gets its power for operation through a small rectifier mounted on the wall together with a small auto transformer and an amplitude switch for regulating the intensity of vibration.

The use of dual magnets permits the magnetic forces to be applied equally in both directions which eliminates the necessity for storing energy by means of springs or similar devices.

This new "Utah" vibrating screen is particularly adapted for screens having openings of ½ inch or less, either wet or dry. Standard screens are made 25, 50 or 60 cycles, 440 volts, the high frequencies being most satisfactory for fine screening. They may be had in open or closed types, with screens for different applications. The open type is available in effective screen area sizes of 4 x 6 feet and 4 x 7 feet.

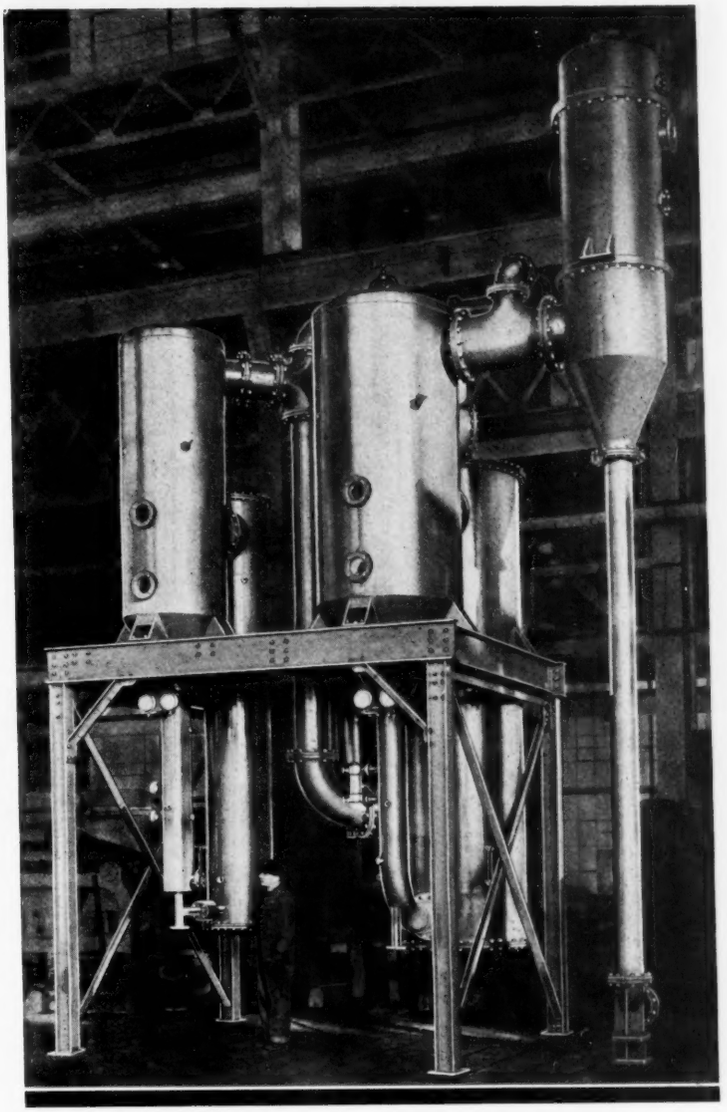
### New Dust Respirator

Recently developed, and approved by the Bureau of Mines, is a respirator for use particularly in Type "A" dusts (those tending to produce silicosis). This bears the name of Cesco No. 90 Healthguard Respirator. Filtering element removes all dust, even of microscopic fineness, yet allows free passage of air. There is only one filtering surface, of large area; and a super-sensitive outlet valve permits no inside air pressure.

Of equal importance with the filter, as a precaution against breathing dust, is the seal at the facial contour. This seal is effected with the aid of a soft metal band which serves the additional purpose of so reducing the headband pressure that it is no longer noticeable. It is engineered and manufactured by the Chicago Eye Shield Co., 2300 Warren Blvd., Chicago.

### Low-Priced Clarity Tester

A new, simple, low-priced clarity tester—for which there has been a long felt need in all industries where cloudiness, turbidity, etc. are important, is now available. It is being marketed by Laboratory Equipment Co., 146 Lafayette St., N. Y. City.



BUFLOVAK Double Effect Evaporator designed especially for concentrating glue. All parts coming in contact with the liquor are made of nickel, which prevents metallic contamination and assists in producing a lighter colored product.

# GLUE . . .

## that sticks everything but the . . .

## . . . BUYER

LIKE the universal solvent, that would be the ultimate in glue. With BUFLOVAK Evaporators the approach is a step closer. Designed on advanced principles, they produce a stronger glue, with greater adhesive and cohesive qualities besides being lighter in color. That is the result obtained from this new BUFLOVAK Double Effect Nickel Evaporator.

Low operating temperatures and the extremely short processing cycle, avoids hydrolysis. With just sufficient circulation for efficient evaporation, the adhesive and cohesive qualities of the product are improved. Production costs are lowered by correct design and the savings in steam and cooling water, which double effect evaporation provides.

Your product more than likely presents entirely different characteristics. Again, the wide experience of BUFLOVAK engineers becomes doubly valuable. In building evaporators and processing equipment for all industrial applications, their experience can be profitably used in the solution of your problems.

And they will gladly share their experience and knowledge in confidence; and without obligation.

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for all process purposes
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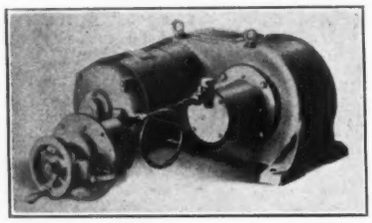
describing the complete BUFLOVAK line
Bulletin No. 297

Copies will be sent on request.

# BUFLOVAK EVAPORATORS

## Variable Speeds by Hydraulic Means

A new development in the U. S. Varidrive motor is illustrated showing remote control of variable speed units by hydraulic means.



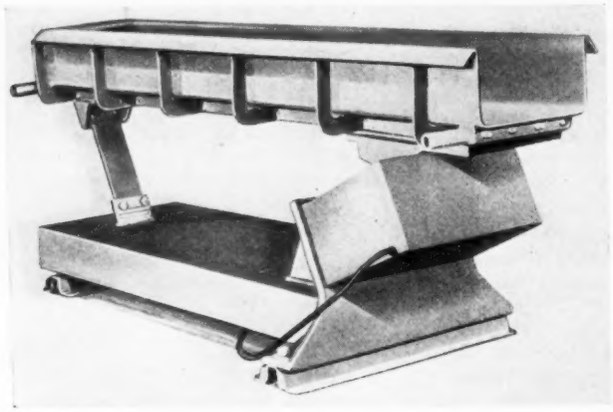
Operator can vary the speed of the compact Varidrive unit over a wide range of speeds by turning the hand-wheel at the remote control station. The remote control is hydraulic and provides a smooth regulation of speed and an infinite number of speeds within the speed range provided. The liquid at the remote control station cylinder is forced through copper tubing to the cylinder at the variable speed unit itself and the movement of this cylinder changes the speed. U. S. Electrical Motors, Inc., Los Angeles, is the manufacturer.

## Safe Weighing of Flammable Liquids

New large type of "Duplex Liquid Scale" has been developed especially for weighing oils, gasoline and other flammable liquids as these liquids are delivered between a carrier and storage. Operation is continuous and automatic. Explosion-proof motors and electrical controls. In event of power failure, system can be operated mechanically, without delaying operations. Guaranteed accuracy is $\pm$ 0.1%. The Richardson Scale Co., Clifton, N. J., is the manufacturer.

## Vibratory Type of Cooling Conveyor

The Syntron Co., 420 N. Lexington ave., Pittsburgh, has just developed a vibratory type of cooling conveyor to be used for the purpose of reducing the temperature content of material from a high degree of heat.



*Reduces temperature while conveying.*

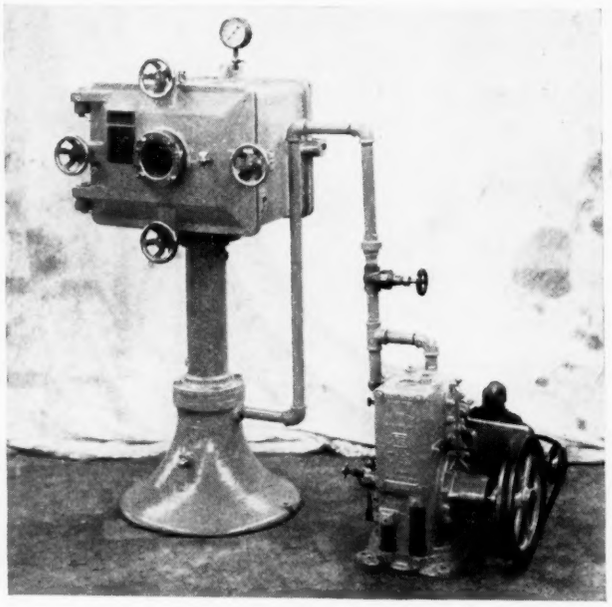
Equipment is made up of a flat pan, trough type vibratory feeder conveyor with provision for keeping the surface of the trough water-cooled at all points, so that the material coming in contact with it and flowing over it, by means of its vibratory action, cools.

Its principal purpose is to cool the material discharged by cookers and driers from their high temperature down to a temperature that will enable them to be easily handled, packaged, or stored. Particular machine illustrated above is built for a large chemical company for this particular purpose.

Major feature of this equipment is the entire absence of any motors, gears, or other mechanical and wearing parts requiring lubrication, etc., the movement of material through the trough being accomplished by the vibratory action induced by the trough's driving pulsating electro-magnet and the cooling effect being accomplished by the circulation of water under the trough's surface or area.

## Laboratory Vacuum Dryer

Recent improvements make the Stokes Laboratory Vacuum Dryer No. 51 an even more suitable piece of apparatus for industrial and research laboratories, technical schools and universities than as previously made. It is used for vacuum drying or evaporating chemicals, pharmaceutical, food and similar products sensitive to heat or oxidation; also for drying hygroscopic materials not readily dried in an atmospheric type oven.



*A very compact unit for the evaporating operation.*

Design is ingenious and very compact with the condenser and receiver making up the stand for the vacuum chamber itself. The vacuum chamber is of special cast iron and contains two 18"x14" shelves with 4" clearance between them. The vertical surface condenser is of the efficient counter-current type with necessary inlet and overflow for cooling water. After condensing, the moisture or solvent removed is collected in a receiver beneath the condenser forming the base of the stand. Each dryer is self-contained as illustrated and is supplied complete with vacuum gauge, vacuum-break valve and either thermometer or steam pressure gauge. The finish is of gray enamel with hand wheels, sight glass covers and fittings nickel plated to present a neat appearance suitable for laboratory installation.

## New Asbestos Disc Filter

The Scientific Filter, N. Y. City, is introducing a new asbestos disk filter. Heads and plates are heavily-built solid castings throughout, with grooves designed for quick feeding of the liquid and drainage at minimum operating pressures, allowing room for building up a small amount of natural sludge found in most liquids without interfering with the filter disks or impeding the rate of flow of the incoming liquid. The full diameter of each disk is utilized for filtration, and practically no liquid is left in the machine. The filter is furnished complete with an all-bronze rotary pump including by-pass pressure control, connected direct to an electric motor, and ready to go to work. The pump can be used independently of the filter for general work.

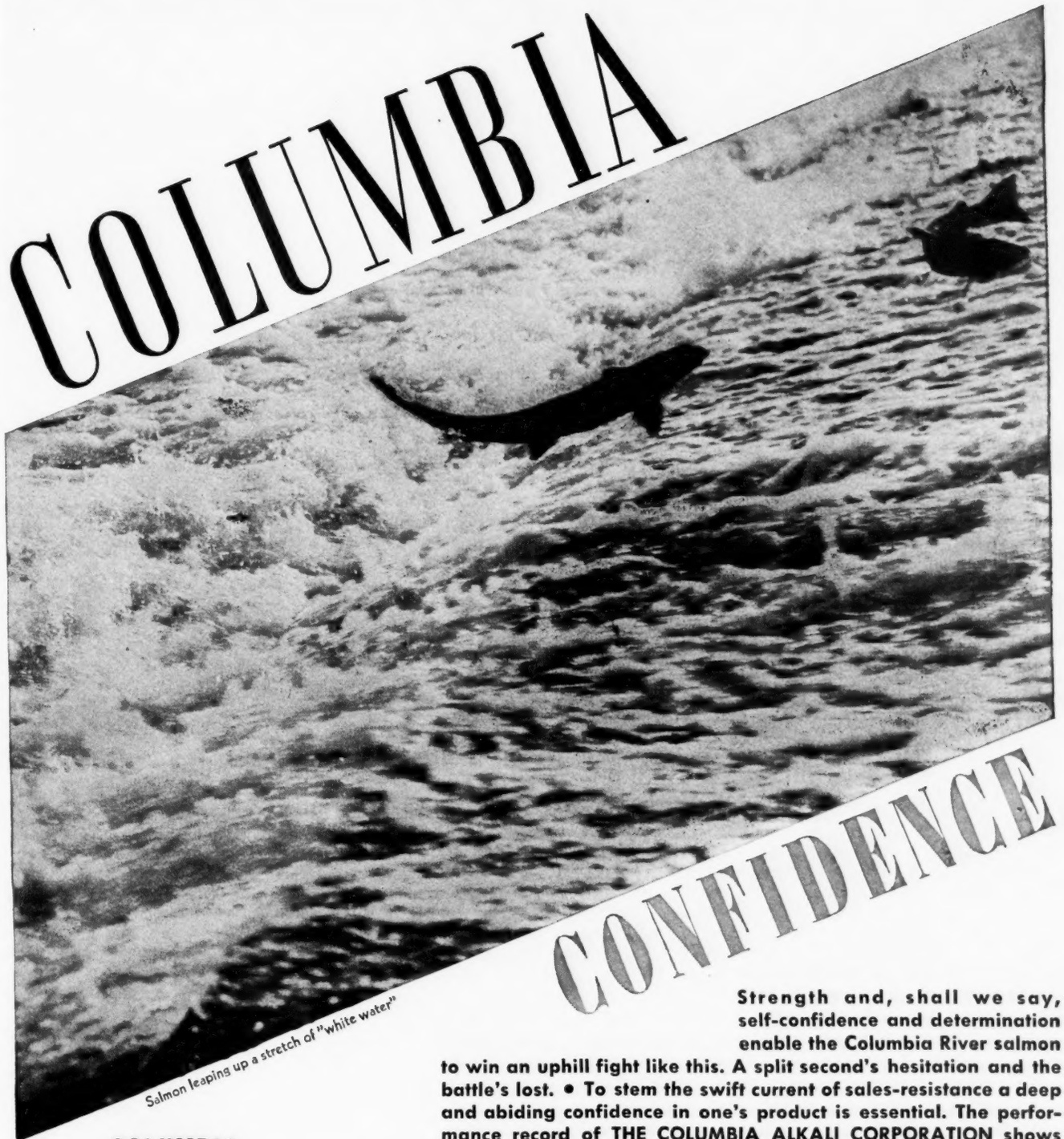
## Novel pH Set

W. A. Taylor & Co., Baltimore, announces a new "Long Range Slide Comparator" especially designed to meet the need for a combination portable and laboratory set covering pH ranges wider than those covered by two indicators.

## New Line of Blow-Off Valves

Very soon now a new series of blow-off and plug valves for the control of both high pressure and low pressure steam will be introduced by the Cochrane Corp., Philadelphia, Pa.

# COLUMBIA



Salmon leaping up a stretch of "white water"

## CONFIDENCE

**Strength and, shall we say, self-confidence and determination enable the Columbia River salmon to win an uphill fight like this. A split second's hesitation and the battle's lost. • To stem the swift current of sales-resistance a deep and abiding confidence in one's product is essential. The performance record of THE COLUMBIA ALKALI CORPORATION shows that such confidence justly may be imposed on the soda ash, caustic soda, modified sodas, sodium bicarbonate, liquid chlorine and other products that come from its plants. Not for a split second has there been the slightest compromise with quality,...and there never will be. • You can count on COLUMBIA to pass on to the consumer all actual improvements in the products and their applications. And you can count on COLUMBIA, like the salmon of the same name, to be ever out in front.**

**COLUMBIA**
**SODA ASH**
**CAUSTIC SODA**
**SODIUM BICARBONATE**
**MODIFIED SODAS**
**CALCIUM CHLORIDE**
**LIQUID CHLORINE**

**THE COLUMBIA ALKALI CORPORATION**

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# Booklets & Catalogs

**Companies whose booklets are reviewed on this page will be glad to supply readers of "Chemical Industries" with copies free, provided this magazine is mentioned and the request is made on company stationery. Your business title should also be given.**

### Chemical

**American Agricultural Chemical Co.**, Michigan Carbon Works, Detroit, Mich. "Cosmic, The Standard Bone Black Pigment," an interestingly illustrated brochure, describing manufacture of bone black, giving technical information for chemists and formulators.

**Barclay Chemical Co., Inc.**, 75 Varick st., N. Y. City. New leaflet, describing details of company's service just issued.

**Eastman Kodak Co.**, Rochester, N. Y. *Synthetic Organic Chemicals* for April features "The Role of Amino Acids in Growth."

**Electro Bleaching Gas Co.**, 60 E. 42nd st., N. Y. City. *The Pioneer* for February, a newsy house organ containing many interesting items of value to chlorine and alkali users.

**Fritzsche Bros., Inc.**, 76 Ninth ave., N. Y. City. Wholesale Price List for March. Calls attention to firm's 65 years of existence.

**Givaudan-Delawanna, Inc.**, 80 5th ave., N. Y. City. The *Givaudanian* for February contains market report of aromatic chemicals, and amusing sidelights on the perfume industry.

**Innis, Speiden & Co.**, 117 Liberty st., N. Y. City. *Isco News* for March lists company's products and features specialties produced in Isco plant at Niagara Falls.

**Laucks Labs., Inc.**, 314 Maritime Bldg., Seattle, Wash. *Laucks Notebook*, Jan.-Feb., contains odds and ends of chemical interest, and third in series of Chemical Case Histories, dealing with chemical phase of plywood industry.

**Mallinckrodt Chemical Works**, St. Louis, Mo. Price List for March.

**Merck & Co., Inc.**, Rahway, N. J. Price List for March.

**New Jersey Zinc Co.**, 160 Front st., N. Y. City. *The Activator* for February has interesting data and charts on zinc oxide, also literature references to zinc pigments.

**Prior Chemical Corp.**, 420 Lexington ave., N. Y. City. *Prioritics* for March announces fifteenth milestone in company's history, also comments on commercial uses for specific kinds of leather.

### Equipment

**Acme Protection Equipment Co., Inc.**, Koppers Bldg., Pittsburgh, Pa. Leaflet outlines and illustrates Acme gas masks, and recently added improvements contributing to genuine advancement in comfort and safety.

**Ajax Electrothermic Corp.**, Trenton, N. J. Bulletin 11 (superseding Bulletin 6), 16 pages, describes their large coreless induction furnaces for melting ferrous and non-ferrous metals. Amply illustrated.

**Bailey Meter Co.**, 1050 Ivanhoe rd., Cleveland, O. Bulletin 301, "Bailey Fluid Meters for Steam—Liquids—Gases." 40 pages, is ready for distribution to those interested in flow meters.

**Bausch & Lomb Optical Co.**, Rochester, N. Y. Catalog D-12, "Research Microscopes and Accessories," lists specifications, descriptions and illustrations.

**Bridgeport Brass Co.**, Bridgeport, Conn. New publication, *Copper Alloy Bulletin*, launched by company in March, is edited for technical and engineering audience. Contains new developments of interest to industrial users of copper and copper alloys. Will be issued monthly and copies may be obtained by writing direct to the company.

**Brown Instrument Co.**, Division of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa. Brown Flow Meter Catalog No. 2004. Handsome 56-page booklet covers company's complete line and explains applications to power plant, water works and gas generation service, as well as to general industrial use.

**Climax-Molybdenum Co.**, 500 5th ave., N. Y. City. *The Moly Matrix* for February calls attention to the use of Moly steels in oil production where heavier loads and high speeds are concerned.

**Eaton Mfg. Co.**, Wilcox-Rich Division, Detroit, Mich. Leaflet on Xaloy published for manufacturers and users of equipment in which abrasive wear is a problem or extreme surface hardness is desirable. Unusual metallurgical properties are claimed and its usefulness in general industrial field is outlined.

**Foxboro Co.**, Foxboro, Mass. "Stabilog Controllers for Liquid Level." 24-page bulletin discussing instruments and application methods for automatic control of liquid level in continuous flow processes.

**General Electric Co.**, Schenectady, N. Y. New line of rotating-cam switches, designed especially for built-in control applications and adaptable to a variety of electrical functions and machine requirements is announced by company and designated as G-E CR3300 rotating-cam switches. Eight-page booklet lists specifications.

**D. W. Haering & Co.**, 3408 W. Monroe st., Chicago, Ill. "The Art of Proportioning," 24-page illustrated catalog, describing operation and application of proportioning equipment in feed-water treatment. Material in former editions revised and brought up to date.

**Harnischfeger Corp.**, 4400 W. National ave., Milwaukee, Wis. "P & H Hoists," profusely illustrated bulletin, contains treatment of both general and specific problems in industrial handling field, describing also the added advantage in handling "off-the-floor."

**E. F. Houghton & Co.**, Philadelphia, Pa. *The Houghton Line*, Feb.-Mar. 1937, 48-page booklet advertising company's products and dispensing business psychology of the Elbert Hubbard type.

**International Nickel Co.**, 67 Wall st., N. Y. City. "Some Consequences and Graphitic Corrosion of Cast Iron," by W. A. Wesley, H. R. Copson, and F. L. Laque, reprinted from *Metals and Alloys*, Dec. 1936. Investigation deals with mechanism of a type of corrosion of cast iron that results in the formation of a surface layer of residual graphite. Copies of reprint are available from company.

**Leeds & Northup Co.**, 4901 Stenton ave., Philadelphia, Pa. Catalog EN-96, "Apparatus for Hydrogen-Ion Concentration Measurements in Laboratory and Plant," 32 pages. Should be of interest to everyone who is concerned with any phase of theoretical or applied chemistry. Apparatus listed is used in research, analytical tests, and in process control in many fields.

**Patterson Foundry & Machine Co.**, East Liverpool, O. Attractive four-page booklet describes The Patterson Dissolver for cutting cotton, dissolving cellulose acetate and natural and synthetic resins and other similar materials of various viscosities.

**H. W. Porter & Co.**, 825 Frelinghuysen ave., Newark, N. J. Novel booklet on the Therm-O-Tile Underground Steam Conduit System clearly shows, step-by-step, how to install Therm-O-Tile. To read the booklet properly one starts with the last page instead of the customary first page.

**Precision Scientific Co.**, 1730 N. Springfield ave., Chicago, Ill. Bulletin 300, "Condensed Catalog on 'Precision'—Freas Constant Temperature Laboratory Equipment," now built solely by Precision Co. Eight pages devoted to a summarization of the salient features of construction.

**Precision Scientific Co.**, 1730 N. Springfield ave., Chicago, Ill. Four-page booklet describes and illustrates the Ful-Kontrol Laboratory Heater. Interchangeable tops quickly adapt Ful-Kontrol to many applications, especially for A. S. T. M. tests of petroleum products.

**Precision Scientific Co.**, 1730 N. Springfield ave., Chicago, Ill. Leaflet announces acquisition by company of complete line of Freas Constant Temperature Laboratory Equipment, also describes and illustrates Freas laboratory ovens for various uses.

**Pulmosan Safety Equipment Co.**, Brooklyn, N. Y. Leaflet devoted to Pulmosan Safety Ladder Shoes.

**Pulmosan Safety Equipment Corp.**, Brooklyn, N. Y. Leaflet lists line of company's chemical fire extinguishers and pump tanks.

**Simplex Oil Heating Corp.**, 30 Church st., N. Y. City. Bulletin 119-37 deals with Simplex Oil Burning Systems of the horizontal rotary type.

**Surface Combustion Corp.**, Toledo, O. Six-page folder "*Wherever Heat is Used in Industry*," for Feb.-Mar. contains reprints of five company ads which have appeared in 1937, depicting installations of furnaces in the locomotive, aircraft, petroleum and shoe manufacturing industries.

**C. J. Tagliabue Mfg. Co.**, Park & Nostrand aves., Brooklyn, N. Y. Catalog No. 900C, 32 pages, describes company's line of Tag Non-Indicating Temperature and Pressure Controllers.

**United States Rubber Products, Inc.**, 1790 Broadway, N. Y. City. "An Album of Familiar Belts," a folder containing 25 reproductions of photos taken in the field and factory, showing interesting and unusual installations of transmission belts in a variety of industries.

**Westinghouse Electric & Mfg. Co.**, Dept. 5-N, East Pittsburgh, Pa. Catalog Section 43-770 describes the Westinghouse Trans-O-Meter, a simple portable device for measuring the transmittancy of flat materials on a direct reading instrument. Of special interest to paper manufacturers.

**Worthington Pump & Machinery Corp.**, Harrison, N. J. Eight-page booklet, Bulletin M-975-B34, gives specifications and illustrations of the Worthington-Gamon Watch Dog Disc Water Meter of the heavy duty type.

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## Dry Ice from Waste Gases

The continued development of the uses of dry ice during the past few years has resulted in renewed search for cheap raw material in order to meet the increasing demand for this valuable product. Waste gases from distilleries and lime kilns are the principal sources of raw material now being used for the production of liquid carbon dioxide and dry ice since they are the lowest-cost raw material available in most localities. About 75 per cent. of the dry ice consumed in the United States is produced from waste gases from these sources.

Although a comparatively new commercial product, the consumption of dry ice has had a gradual and consistent growth during the past few years. New uses are continually being found, as the unusual properties of dry ice become more generally understood and equipment is developed for the economical handling and use of the product. The recent developments in equipment for the efficient use of the product assure a continued increase in consumption.

In appraising the value of waste gas from a lime or cement plant for the production of dry ice the important items of consideration are location, the purity of the waste gas, and the cost of power and services available.

The principal items of cost in the manufacture of dry ice are raw material, power and labor and it is logical to look to the rich waste gases from the lime and cement industry, where steam and power are available at low cost, for the development of new production capacity. Waste-gas recovery plants can be installed without interference with the operations of the lime or cement plant, and the dry-ice plant can be operated as an additional department of the present business.

The technical problems of purifying and concentrating carbon dioxide from waste lime- and cement-plant gases have been solved for most types of impurities found in the raw materials and the matter of handling a given raw material is primarily an economic problem. The converting of the purified gas into merchantable dry ice is carried out in standard manufacturing units producing the commercial size block 10 in. by 10 in. by 10 in. weighing about 50 lbs.—W. N. Neidig, The Lummus Co., *Pit and Quarry*, January, p105.

# New Products and Processes

## A Digest of Chemical Uses and U.S. Patents

Automatic packing of Witco carbon black.

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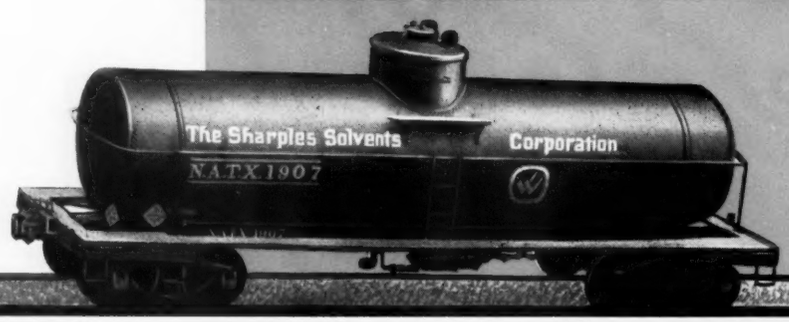


SHARPLES TRADE MARK SOLVENTS

# SHARPLES SOLVENTS

THE SHARPLES SOLVENTS CORP., 2301 Westmoreland Street, Philadelphia, Pennsylvania

# Thermal Insulating Materials

**By J. S. F. Gard, B.Sc., A.I.C.***

A SURVEY of the basic materials available and suitable for thermal insulation indicates that these are distinctly limited, and it is by varying combinations of these basic materials that the majority of finished products are evolved. The range of insulators can be roughly split up into groups according to the temperature, and such a classification, together with the materials used in each group, is as follows:

1. Low Temperature Range—below 200° F.: Refrigeration; transporters for ice, solid $CO_2$, ice cream, etc.; cold storage; air conditioning; cool-water systems; hot-water systems; storage tanks; tank wagons (road and rail); buildings, etc.

For such uses the most commonly used materials are granulated cork, cork board, wood (ordinary and special), wood pulp, pulp boards, straw boards, grasses, charcoal, sponge rubber, mineral fibres, aluminum foil, etc.

2. Medium Temperature Range—200° to 700° F.: Boilers; steam lines; steam accumulators; hot-air systems; drying plant; flue gas ducting; turbines; cylinders; tank wagons (road and rail), etc.

In this range the most used commodities are 85 per cent. magnesia-asbestos, other magnesia compositions, diatomaceous compositions, slag wool, spun glass, felted asbestos, bonded asbestos, asbestos mattresses, asbestos paper and millboard in various manufactured forms, aluminum foil, other metal foils and sheets, etc.

3. Moderately High Temperature Range—600° to 1200° F.: Superheated-steam plant; ovens; stoves; Diesel engine exhausts, etc.

Here the choice is more limited and is restricted to asbestos (up to 850° F.), spun glass (up to 900° F.), kieselguhr, asbestos compositions, magnesia-kieselguhr-asbestos compositions, aluminum foil, etc.

4. High Temperature Range—1000° F. upwards: Kilns; furnaces; gas-retort settings; regenerative stoves; blast furnaces; hot-blast mains; gas producers; coke ovens, etc.

Our choice of materials is now restricted to silicas and clays, natural and manufactured in various forms.

The guaranteed annual saving in heat by the various grades of material and thickness considered should be set against the interest upon the capital outlay. By this means, also, what is usually termed the economical thickness is ascertained, for a point will be reached where an additional increment of thickness will not be justified by the extra saving effected. The bulk of the saving is ensured by the primary thickness applied, subsequent increments having proportionally less effect, since the reduction of heat loss does not vary directly with thickness.

Insulating materials should not be purchased by weight unless the covering capacity is known, but rather by the unit of surface area, or lineal run of pipe covered to a given thickness; moreover, the lighter materials are usually the better insulators, and therefore a given weight will cover a greater surface with better effect.

Of primary consideration in the temperature range below 200° F. is the selection of materials not susceptible to moisture absorption, or the final treatment of whatever is used to prevent this undesirable effect. Wherever a temperature appreciably lower than that of the surrounding air is established, condensation is sure to occur; if moisture is condensed on an absorbent surface, such as most classes of insulation media, this will find its way into the insulation, and, to say the least, it will seriously impair, if not entirely destroy, its thermal efficiency; further, there is little prospect of subsequent drying out.

The ideal medium for such conditions is undoubtedly cork board; cork is absolutely waterproof and free from capillarity; that is, there is no transfer of moisture through the mass by capillary action. The thickness of insulation employed should be such that the surface temperature is brought as nearly as possible to that of the surrounding atmosphere. Here, again, cork board is eminently suitable, since it has a comparatively very low coefficient of thermal conductivity, which enables less thickness for the same efficiency to be used. A medium of fairly recent introduction in this field is sponge rubber or expanded rubber. This has the advantage of being very light and remarkably efficient; its disadvantages are that it is liable to deterioration, becomes hard and brittle at low temperature, and often evolves appreciable amounts of hydrogen sulfide. Other materials frequently employed are hair and wool felts, light woods (such as balsa) and slag wool. Of these the felts and woods are susceptible to attack by vermin, etc., and slag wool settles out, leaving voids and uninsulated pockets and becomes less efficient as the packing density increases.

### Transport of Fused Solids

The transport of liquids at an elevated temperature which become solid at ordinary temperatures has been made possible by the application of insulation. Instances of this are—bitumen, tar, glucose, etc. The essentials are low density and high thermal efficiency. The following example is one of an actual case dealt with by the author. A wagon conveying a tank was designed to be loaded with heated bitumen at a temperature of 300° F. in a fluid condition; a journey of ten hours was then to be made, and the temperature of the bitumen must not have fallen below 275° F., otherwise solidification would have set in and the load could not be run off. From the lightness point of view, cork board at a density of 9 lbs. per cu. ft. would be the most suitable, but it is very inadvisable to use this at temperatures above 200° F. Alternatives are crumpled aluminum foil of 4 lbs. per cu. ft. density (including accessories, etc.) in layers and 85 per cent. magnesia at 12 lbs. per cu. ft. density. The former has disadvantages in the difficulty of application and the risk of corrosion of the steel body being set up owing to the different electrical potentials of the two metals. When 85 per cent. magnesia was decided on, the thickness required was determined as 1½ inches.

In the selection of insulating materials for temperatures of from 200° F. to about 1000° F. no sweating troubles arise, but new factors appear. Among these are the maintaining of the elevated temperatures as far as possible, such as in steam lines and oil-circulation pipes, between the heat generating plant and the point of usage. Insulation has a considerable bearing on the planning and layout of a factory, for without it steam generating plant and operating units would of necessity have to be placed as near each other as possible, whereas with efficient insulation the former can be centralized and steam carried long distances. Waste heat recovery has also become an economic proposition via thermal insulation.

The choice of suitable material is not difficult if the maximum efficiency is desired; it should be remembered that first cost is not necessarily of primary importance, and actual differences in cost (that is, not cost per ton) are usually small or distinctly in favor of the "more expensive." For instance, the engineer may have two offers before him: (*a*) 85 per cent. plastic magnesia at 27s. per cwt., and (*b*) a composition at 10s. per cwt.

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From paper presented to meeting of the Institute of Fuel, in London, on Wednesday, Feb. 10.

* Of the Washington Chemical Co., Branch of Turner and Newall, Ltd.

He has a total area of 2,200 sq. ft. to insulate to a thickness of 1½ inches, which can be done with 30 cwt. of (*a*) costing £40 10s., or with 110 cwt. of (*b*) costing £55 (most of the cheaper compositions have a covering capacity of about 600 sq. ft. per ton 1 inch thick); the application costs are the same in both cases, but the heat loss through (*b*) is approximately double that through (*a*). If all the facts are taken into consideration the choice here is not a difficult one. It is however, often much more involved than in this simple case. The most efficient materials in this section are 85 per cent. magnesia, spun glass, slag wool and asbestos felts, and a comparison of their thermal properties is given in the following table:

| Material | Density lb. per Cu. Ft. | "K" at mean temperature of 200° F. | 400° F. | Heat transmission through 2-inch thickness on 4-inch pipe at hot face temperature 300° F. | 600° F. |
|---|---|---|---|---|---|
| 85% magnesia ... | 12 | 0.42 | 0.51 | 64½ | 171 |
| Spun glass ..... | 12 | 0.42 | 0.51 | 60 | 186 |
| Slag wool ..... | 15 | 0.45 | 0.56 | 67 | 186 |
| Asbestos ..... | 11 | 0.47 | 0.58 | 68 | 189 |

### Spun Glass and Slag Wool

It will be seen that spun glass is slightly better than 85 per cent. magnesia as regards efficiency at temperatures up to about 300° F., but at higher temperatures the conditions are reversed; the same applies to asbestos felt, while slag wool is not quite so good. In some work, such as marine, density is of paramount importance, and even on pipe lines the lighter material has the advantage of placing less strain on the supports. Slag wool has the great drawback that it is not self-supporting and must either be packed in an annular space or be made up in some form of container; it breaks down in presence of water, and where vibration is present tends to settle, becoming less efficient itself and leaving uninsulated voids. Spun glass retains its original packing and is resilient, but is most unpleasant to handle; further, it is most inadvisable to employ it in the vicinity of moving machinery, as glass fibres are liable to become detached and cause damage to bearings, etc.

### Double Coatings for High Temperature Work

Modern steam raising and distributing plant is tending to higher and higher pressures and temperatures, and often 750° F. and even 1000° F. is reached with superheated steam. The need for efficient insulation increases with increasing temperature, and in fact such high temperatures could not be attained and maintained without thermal insulation. This, however, presented an entirely new problem to the insulation manufacturers, since many of the old-established types were no longer suitable: for instance, 85 per cent. magnesia loses mechanical strength and tends to break down when subjected to 625° F. and over, owing to the loss of water and carbon dioxide, the carbonate becoming more or less calcined to the oxide on the inner layers. There is a steep temperature gradient through an insulating cover, and the more efficient the cover, the steeper the gradient; hence there is always a portion of the thickness which falls below the damaging temperature. Another consideration is that any insulation which is suitable for these higher temperatures is of necessity heavier, less efficient thermally and more costly than insulation for lower temperatures. Thus the most economical way of providing insulation for the surfaces now under consideration is to first apply a material which will not break down at the high temperature and surmount this with the more efficient material; the thickness of the first layer must be such that at the interface of the two the temperature is just below the limiting or "safe" temperature of the outer layer. Most manufacturers are in a position to supply such dual coverings, and will recommend the relative thicknesses.

The usual and most convenient form of insulating material in the high temperature range of combustion is the brick used in conjunction with special insulating mortars of similar composition for jointing and laying; it is, incidentally, most desirable for the joints to be as thin as possible, and as the bricks are invariably very porous and absorbent, they should be well wetted in order to prevent them from drawing the water from the mortar before the latter has time to set. Other useful products are insulating concrete and insulating powders.

The "long-felt want" in this direction is a combination of insulating and refractory properties, with as much mechanical strength as possible in one and the same brick. A considerable amount of work has already been carried out with this end in view both in this country and in America, with some degree of success; but development is still in its infancy. The problem is not an easy one, and its solution can only be a compromise between the several desirable factors, since for a good refractory a close texture is usually deemed necessary, whereas a close texture in high-temperature-resisting materials gives high density; thermal conductivity, on the other hand, is more or less proportional to density. It has been found, however, that at the higher temperatures, size and configuration of pores also play an important rôle in conductivity.

## Cellulose Solvents in Finishing

***By P. E. Hattinger***

Cuprammonium hydroxide is perhaps the most interesting solvent for cellulose. In 1933 Tocco and Debenedette discovered that the copper in cuprammonium may be replaced by zinc or by cadmium, giving in each case an amine capable of taking cellulose into solution. No technical application seems to have been made of this discovery, probably because copper amine is far more easily prepared than either the zinc or the cadmium compound.

More recently a tetra-substituted ammonium hydroxide of unique solvent power for wood pulp and cellulose has been placed on the market. Here is a non-volatile organic substance which is as strong a base as caustic soda, but more soluble in oils, fats, waxes and gums. A substance like this may possess many useful qualities as an aid in textile finishing.

Beryllium perchlorate, $Be(ClO_4)_2$, has been reported earlier this year to have solvent properties toward cellulose. Dobry (*Bull. Soc. Chim.* 1936, 312), employs a solution containing 126 gm. beryllium oxide and 1,000 gm. perchloric acid made up to a liter with water.

According to Heberlein and Co., A.G., Wattwill, Switzerland, ammoniacal cupric oxide, synonymous with cuprammonium hydroxide, may be usefully applied in finishing in several ways. When bleached or otherwise treated vegetable fibers are treated with such a solution, a thorough change in the property of the material takes place. In general, a form of stiffening is produced. In Brit. Pat. 276,352 raw vegetable fibers having their natural incrustations, are subjected to swelling agents including ammoniacal copper oxide, without tension, when wool-like effects are obtained. Patents 301,392 and 403,255 also describe processes involving ammoniacal copper oxide. Patent 433,751 is an elaboration of these early processes and combines with the solvent treatment, a species of mercerization. Thus, raw cotton-voile fabric after singeing is passed through ammoniacal copper oxide solution containing 18 gm. of copper per liter, 10 gm. of free caustic soda and 3 gm. of sulfoleate. When the treatment has lasted half a minute, the fabric is immediately mercerized under tension with soda and then bleached as usual. The result is that all protruding fibers and excrescences on the vegetable material are removed, leaving it smooth and shiny. Further-

more, fabrics treated in this manner do not lose their appearance and effect if subsequently bleached, washed or boiled.

The application of cuprammonium solution to the production of permanently stiff, multi-ply fabrics from which shirt collars, cuffs and tablecloths can be made, is of great interest now that the Trubenizing process, after Liebowitz, is getting established. In the original method, a layer of cellulose acetate fabric is interposed between layers of cotton and the three are impregnated in a plasticizing solvent and then pressed at a high temperature.

The method described in Brit. Pat. 443,635 is a wet process rather than a dry one. The finish obtained is not affected by dry-cleaning solvent, nor by laundering. Any desired degree of stiffness can be obtained. It should be noted, however, that this process would not seem to lend itself to the treatment of fabrics already dyed, (but no claims are made in this respect), nor is any statement regarding the air-permeability made.

Briefly, it consists in immersing several layers of fabrics in a cuprammonium solution of cellulose which may, if desired, have solvent action on the fabric. The plies of fabric are pressed together and the resulting compound fabric treated in a coagulating bath. Impregnation with the cellulose unites the several fabrics together into an apparently fiberless structure having an entire absence of loose excrescences. The treated fabric is claimed to have a higher tensile strength than the original. When cut the material does not fray. The process is capable of being varied in a number of ways and a variety of effects is obtainable along such lines.

The fact that calcium thiocyanate solutions dissolve regenerated cellulose has recently given us a useful method for analyzing fabric mixtures. The first published statement of this phenomenon appeared in a Russian journal of 1912, but practical application did not follow until much later. For example, Krais and Markert, (*J. Textile Inst.* 1932), employed a solution of 100 gm. technical calcium thiocyanate in 100 cc. of solution to dissolve viscose and real silk at the same time, to separate them from cotton and wool. McGregor and Fryd (*J. Textile Inst.* 1933), propose to employ an acidified solution of calcium thiocyanate boiling at 122 to 123° C., in order to remove viscose rayon from cotton in garnetted waste. A more recent report by Mease and Jessup (*J. Research*, Nat. Bureau of Standards 1935), describes how, by the use of calcium thiocyanate solution of selected concentrations, still further separations may be effected. In separating silk and viscose, for example, they found that thiocyanate of sp. gr. 1.2 would dissolve silk readily, while viscose rayon was only slightly attacked. With solutions of sp. gr. 1.35 to 1.36, viscose, nitrocellulose, and cuprammonium were readily soluble, yet almost without action on cotton. There would appear to be unexplored possibilities in calcium thiocyanate solution in resist printing worthy of investigation. *American Dyestuff Reporter*, Mar. 8, '37, p120.

## Plastics

In a survey of the history, production, and uses of synthetic resins before the Royal Society of Arts, H. V. Potter, B.Sc., F.I.C. (Managing Director, Bakelite, Ltd.), stated that methyl acrylate resinoids (organic glass), are reasonably new, and their properties and process of manufacture have yet to be fully investigated, but they are interesting and show promise of becoming of commercial value.

There are several kinds according to the esters they have been produced from, but the most interesting is the methyl ester. This in the initial state is a liquid, but on exposure to light, oxygen or heat it quickly polymerizes, to form a more stable solid compound which is water white and glass-like in appearance. It can be cast in sheets, blocks, etc., which can be readily machined, turned, and polished. It has a softening point a little over 120° C. At the same time it can be made reasonably flexible. A sheet of it looks exactly like glass until handled. It is much lighter, with a density of about 1.15, that is, a little heavier than water; further, it will bend on warming.

On account of its lightness and non-brittle character it is replacing glass for airplane observation screens and windows. It is fast to light, but on the other hand not so hard as glass, and, therefore, is subject to wear more readily. Its possibility has not yet been exploited, and the new materials from which it is made are expensive. So far these new resinoids produce a material which has greater light transmission, particularly to ultra-violet rays, and which does not change color and is less fragile, but has not the same strength of resistance to wear and is attacked by certain solvents.—*Chemical Trade Journal*, Dec. 11, 1936.

### Low-Loss Plastic

Durez 1601, a phenolic molding compound with an extremely low power factor is announced by General Plastics, No. Tonawanda, N. Y. For use on high frequency radio and electrical equipment, this material has a power factor (A.S.T.M.) of 0.34%, considerably lower than any material of its type. Its excellent molding qualities permit its use for a variety of applications such as X-ray machines, diathermy apparatus, high frequency measuring and research equipment, short wave radio parts, etc.

### Impact-Resistant Molding Materials

Bakelite molding materials which range in impact strength on an A.S.T.M. standard test specimen from 0.22 to 2.0 ft. lbs. energy to break (2.75 to 25 ft. lbs. per inch square) are announced by The Bakelite Corp., 247 Park ave., N. Y. City. These materials may be classified as improved impact, medium impact, medium-high impact, and high impact; provide molded parts, in addition to impact resistance, with other properties such as chemical and water resistance, or dielectric properties. These products are particularly suitable for handset telephones, golf club heads, football shoe cleats, instrument cases, junction boxes, oil well equipment, rayon spinning buckets, etc.

## Textiles

Cellulosic fabrics are rendered crease-resistant by forming or depositing substantially within the structure of the cellulose a metallic compound in a vitreous or transparent or semi-transparent form in a state of continuity other than a resin. Preferred metallic compounds are metallic salts of silicic acid, boro-silicic acid, boric acid or phosphoric acid; as assistants to the retention of the vitreous state may be added glycol, glycerine or other polyhydric alcohol, or lactic, tartaric, citric, or other hydroxy acid, also formic or acetic acid. The fabric may be dried and heated to 150° C. Any sizing or stiffening agent must first be removed from the fabric. In examples: (1) a cellulosic fabric, *e.g.*, of rayon, is freed from any sizing material and impregnated with a 5—10% solution of sodium silicate containing ½—1% glycerin, squeezed and dried in hot air. The fabric is then passed over heated rollers or plates at 100—150° C.; (2) a solution of borax, caustic soda and sodium silicate is added with stirring to a hot solution of zinc acetate, to precipitate a boro-silicate of zinc. The precipitate is washed and dissolved in 5% acetic acid containing ½—1% glycerine or glucose to form a solution containing 10—15% solids. A cellulosic fabric is impregnated in this solution, squeezed, dried, and heated as before. U.S.P. 1,734,516 is referred to in E. P. 457,659.

### Textile Flame-Proofing Agent

A flame-proofing agent for textiles and paper has been developed by du Pont. Textiles and paper so treated are highly flame-proof, and at the same time have a soft, pleasing "feel." In addition, it does not have any appreciable influence on the strength of textiles and paper, or on the dyestuffs commonly used.

### Month's New Dyes

National Carbanthrene Khaki 2G paste is a new addition to National Aniline's line of anthraquinone vat dyes, produces khaki shades of excellent fastness to perspiration, washing, boiling soap and boiling soda ash, chlorine, peroxide bleach and rubbing, and very good fastness to sunlight. It reduces readily and is suited for dyeing in tubs, machines and for pad-jig work.

General Dyestuff Corp. releases include Diamine Orange BA, a direct dyestuff especially recommended for the dyeing of silk-cotton unions and of particular interest for hosiery dyers. The product yields uniform shades even from a degumming bath.

### Metaphosphate In Viscose Production

To facilitate the filtration of viscose for use in the manufacture of artificial silk, prior to filtration an aqueous solution of sodium hexametaphosphate may be added to it. The quantity added may be 0.1 per cent. of hexametaphosphate based on the weight of the viscose. The addition results in the formation of a complex calcium sodium phosphoric acid compound which remains in solution during the filtration of the viscose, thus removing difficulties of filtration by preventing the formation of insoluble calcium silicate impurities. Specification 449,428 is referred to in E. P. 457, 596.

### Dull Finish for Silk

A permanent dull finish is imparted to silk by passing it through a bath of viscose containing crystalline barium hydroxide kept at a temperature of 0° to 15° C. Recommended proportions of ingredients are viscose 100 to 200, barium hydroxide 60 to 120 and sufficient water to make up 1,000 parts. A non-ripened viscose is used. After immersion, the silk is squeezed out and then dipped in cold dilute sulfuric acid when barium sulfate precipitates upon the fibre. The silk is finally washed thoroughly with water before going through the usual treatment preceding dyeing. Gillet, *Fils et Tissus*, 1936, p699.

## *Coatings*

### Protection Metal Surfaces

"Electrocolor," process for coloring metal, can be applied on nearly all base metals and various other articles. By this process it is possible to obtain, electrolytically, surface coatings of great brilliance and of almost any desired color or shade. United Chromium, Inc., 51 E. 42d st., N. Y. City, holds the patents.

"Ne-Ver-Rust," a thin transparent liquid composed of mineral greases, dissolved with the pure gum spirits of turpentine, has been developed by the Never Rust Mfg. Co., 1771 E. 18th st., Brooklyn, N. Y., for parts of machinery and polished surfaces that cannot be galvanized or protected by copper or zinc coatings. When applied to metal surfaces, it leaves a film, coating, entering and filling the pores, making the metal impervious to dampness. Compound is not injurious to the most highly polished surface.

### Method Depositing Silver Coating

A method of depositing a mirror-like silver coating on materials such as cardboard, paper and leather is based upon the principle of cathodic pulverization. Material to be coated is placed in an evacuated apparatus between two silver electrodes while a high tension current is being passed. The process is said to be highly economical, only a fraction of a gram being required to coat one yard of paper so that about 5,000 yards can be coated with 3 lbs. of metallic silver each day. *Le Papier*, 1936, p855.

### Aluminum Coating Paints

Aluminum paints for all interior and exterior purposes, as a primer or finish coat, are being marketed by Crescent Bronze Powder Co., 116 West Illinois st., Chicago, Ill., under the name, "Cres-Lite Aluminum Paint." Paint permanence is obtained with this coating, from the tiny, flat, thin flakes of pure aluminum metal, which float to the surface of the paint film, and "leaf" to form an actual coating of metallic aluminum. This leafed film is opaque to sunlight, forms a "roof" over the underlying vehicle, and protects it from the sun's rays and the elements.

## *Miscellaneous*

The substitution of corn oil for the imported rapeseed in the manufacture of lubricants, and the utilization of palm oil abroad as a motor fuel are mentioned in the *Journal of Commerce*, Mar. 9, '37.

### Addition To Embalming Fluids

One-half of one per cent. of Areskap-50 in concentrated embalming fluids makes it possible for these solutions to permeate the body completely, and so effective is the dispersion of color through its use that a healthier glow than enjoyed in life is attained. Manufactured by Monsanto Chemical Co.

### Protection of Magnesium Alloys

Magnesium alloys are very susceptible to corrosive attack under saline conditions, and protective mechanical coatings applied to their surfaces have a low degree of adherence. An anodic process recently perfected by R. W. Buzzard and J. H. Wilson and described in January '37, *Journal of Research*, National Bureau of Standards, does not reduce the cross section materially and gives corrosion protection and paint adhesion equivalent to that afforded by the chrome pickle. The part to be anodized is first cleaned in an electrolytic bath of sodium carbonate and trisodium phosphate, and is then made the anode in a bath containing 10% sodium dichromate and from 2 to 5% monosodium phosphate. The anodic film may be applied over a wide range of current density and temperature, but the most satisfactory results have been obtained with 5 to 10 amps. per sq. ft. at 50° C.

### Naphthalene Controls Tobacco Maggots

Naphthalene flakes scattered under tobacco-seed bed cloths at the rate of one and a half pounds to 100 sq. yds. will kill maggots and, according to Dr. B. B. Fulton, research entomologist at N. C. State College, gives the best form of controlling the maggots.

### Latex Stabilizer

S1, a latex stabilizer, suitable for use in latex compounds, is announced by Vultex Chemical, Cambridge, Mass. It is very effective in extremely small quantities, does not induce foaming, and has no effect upon the physical properties or aging of rubber. It is non-staining and imparts no odor to the product.

### Durable Roads

A mixture of resinous materials, *i.e.*, furfural and its derivatives, added to the base of road-building materials, will make it possible to build satisfactory surfaces in many places where gravel, crushed rock and other materials are not available. Method, developed by Dr. Hans Winterkorn, Missouri College of Agriculture, Columbia, Mo., is said to create material of remarkable tensile strength and water resistance.

### Combination Tanning Process

The production of leather and more particularly certain combination processes of tanning in which metal and aldehyde tanning compounds are used is the subject of a patent granted to Geo. R. Pensel, Amsterdam, N. Y. *The Leather Manufacturer*, Mar. '37, p47.

### Resin Base Sealer

Rezene, a resin base sealer that penetrates and binds the surface of adobe but does not discolor it, is a development of I. F. Laucks, Inc., Seattle, Wash. It can be applied to new or old adobe bricks, or adobe construction by painting or spraying. A few gallons of the sealer is enough to protect a good-sized adobe house for several years.

### New Industrial Use For Alcohol

Invention of an alcoholic steam radiator to heat houses and water and for use as an air conditioner is announced by General Electric. The device works best on pure grain alcohol.

### New Source of Aluminum Oxide

Nepheline Syenite, a material which provides a more uniform and economical source of aluminum oxide for the glass industry, is being produced by Great Lakes Foundry Sand Co., Ceramics Division, Detroit, Mich. Sold to the glass industry as a granular concentrate, it provides a material not only unusually high in aluminum oxide but so high in alkalies that it has a much lower fusion point than potash feldspar.

### Synthetic Rubber from Garbage

A process by which synthetic rubber can be made from a garbage base for only 3c per pound, has been invented by Dr. A. Francis Cullen, Savannah, Ga. In its manufacture, valuable by-products are also produced, one being a powerful explosive that has 18% more rapid detonation than T.N.T. *Journal of Commerce,* March 18.

### Photographic Prints on Rubber

Actual photographic prints upon rubber surfaces, as well as paper, fabric, leather and other surfaces, may now be reproduced by means of a new liquid sensitizer. The picture prints are made direct from the original negative. Known as Trans-Pix, the liquid material sensitizes the surface upon which it is applied, with sunlight or photoflood exposure being sufficient to produce the picture. Once reproduced, the picture remains permanently upon the surface and is not affected by washing, additional exposure, etc. Ador-Transfoto-Nega-Print Co., 50 East Fordham Road, New York City, is the producer.

### Phosphates as Electrolytes in Accumulators

Use of aqueous solutions of neutral alkaline phosphates as electrolytes in accumulators is claimed in D.R.P. 638,760. The phosphates can advantageously replace sulfuric acid. Sulfation is entirely avoided, and any existing deposits of sulfate are removed by the phosphate. Accumulators of the neutral phosphate type can be charged to high voltages and are readily recharged.

### Synthetic Marble

In the manufacture of synthetic marble, different colored masses may be roughly mixed to simulate natural markings. Resulting product may be rendered frost-proof and moisture-proof by immersing it in a solution of barium hydrate, drying, and then immersing it in a solution of magnesium or zinc fluoride or a mixture thereof, or by immersing it in a solution of a double fluoride of silicon and a metal, *e.g.*, magnesium or zinc silicofluoride, or in a solution of silicic acid or silicon fluoride or baryta water. E. P. 457, 623.

### Odorless Timber-Preservative Paint

A fluid for wood impregnating and painting, which is odorless and almost stainless, but very effective against destructive insects and dry-rot, will be shown at the coming Leipzig Spring Fair. The paint may be brushed on to beams already in place, or the wood may be impregnated before use. *Chemical Trade Journal,* Feb. 26, '37, p192.

### Prevention Stain, Mold, And Decay In Millwork

Santophen 20-PA, for the preservation of millwork, such as sash, doors, frames, etc., is a new Monsanto product. Material is a concentrated solution of Pentachlorphenol dissolved in suitable organic solvents.

### Possible New Fertilizer Material

The ammoniation of waste sulfite liquor and its possible use as a fertilizer material is discussed in a paper by M. Phillips, M. J. Goss, B. E. Brown, and F. R. Reid, Bureau of Chemistry and Soils, in the August 1936 issue, *U. S. Journal of Agricultural Research.*

### Acetone In Clearing Rice

Research on the use of acetone in the clearing of rice was carried out by the Korean Nitrogenous Fertilizer Company, Yokohama, Japan. No details are available, but it is stated that although the rice obtained is superior to that cleared by other methods, yet the acetone recovery problem, solution of which is essential to the economics of the process, has not yet been fully worked out. *Chemical Trade Journal.*

### Rayon Tires Better For Speed

Tires made of rayon cords will give, in some instances, four to five times as much mileage as other tires, according to P. W. Litchfield, president, Goodyear Tire & Rubber Co., in announcing this development.

### Permanganates Promote Plant Growth

In preliminary tests carried out by M. E. Webster and Ian M. Robertson, Macaulay Inst. for Soil Research, Craigiebuckler, Aberdeen, Scotland, it was observed that the application of potassium permanganate to various plants was followed by a marked growth response. Permanganates were much more effective than manganous salts, but both produced marked increases in growth. British *Nature.*

### Sodium Silicate In Mortars

Sodium silicate as an ingredient of mortar is being tried out in Germany. The silicate is used in conjunction with trass, a volcanic tufa, which occurs particularly in the Rhine Province. Trass-waterglass mortars are said to possess great cohesion and elasticity, to be immune against aging and fatigue, and to offer waterproofing protection. The new material is already used both in building and in road paving, while quite recently successful trials have been made with the mixture as a plaster material for exposed, outside walls. *Chemical Trade Journal.*

### Latex-Bitumen Joint Filler

Combining latex and bitumen, an improved joint filler, developed and tested in new and old concrete paving by the laboratory of the California Division of Highways, possesses the essential characteristics of stickiness, combined with little or no tendency to flow at high temperatures and high ductility at low temperatures. During early tests, best results were obtained with a mixture of approximately 70% soft-grade, slow-curing road oil and 30% of commercial latex. To avoid foaming of the latex, mixing temperatures were maintained at 200° F. The source of the road oil proved important, since two oils of the same grade, but from different sources, gave quite different results. *The Rubber Age,* Mar. '37, p362.

### Lemon Oil Substitute

Lemonene A is a product which successfully replaces lemon oil completely in many cases, and in part for cosmetics, candies, cakes, beverages, ice creams, etc. Glyco Products, 148 Lafayette St., N. Y. C., manufacturer, states that because it is extremely low priced, it can be mixed with lemon oil and so reduce the cost of the flavoring or odor materials considerably.

# U. S. Chemical Patents

## *A Complete Check—List of Products, Chemicals, Process Industries*

### Agricultural Chemicals

Manufacture organic phosphates. No. 2,071,323. Shailer L. Bass to Dow Chemical Co., both of Midland, Mich.

Fertilizer spray. No. 2,072,124. Herman C. Neuman, Dearborn, Mich.

Manufacture granular calcium phosphates. No. 2.072,980. Harry A. Curtis, Knoxville, Tenn., to T. V. A., Wilson Dam, Ala.

Production phosphorus from run-of-the-mine phosphate rock. No. 2,072,981. Harry A. Curtis, Knoxville, Tenn., to T. V. A., Wilson Dam, Ala.

### Apparatus

Pulverizer. Nos. 2,071,379-80. Ervin G. Bailey, Easton, Pa., and Perry R. Cassidy and Ralph M. Hardgrove, Bethlehem, Pa., to Babcock & Wilcox Co., Newark, N. J.

Pulverizing unit. No. 2,071,381. Ralph M. Hardgrove, Westfield, N. J., to Babcock & Wilcox Co., Newark, N. J.

Apparatus and method for producing flakes, etc., from plastic masses. No. 2,071,434. Axel Uno Sarnmark, Gothenburg, Sweden.

Device and process for determining temperature distribution over the surface of a solid body. No. 2,071,471. Paul Neubert, Leverkusen-I.G. Werk, Germany, to I. G., Frankfort-am-Main, Germany.

Apparatus for subjecting material to action of silent electric discharges. No. 2,071,551. Geo. L. Matheson, Union, N. J., to Standard Oil Development Co., corporation of Del.

Apparatus for distilling spirituous liquors. No. 2,071,693. Thos. Jos. Hines, Louisville, Ky.

Pickling apparatus. No. 2,071,818. Albert Dietzel, Pittsburgh, Pa.

Centrifugal pump. No. 2,072,033. Christian L. Frohnert, So. Brownsville, Pa.

Process and apparatus for fractional distillation of liquids. No. 2,072,093. Angus R. Blakey, Orange, N. J., to Doherty Research Co., New York City.

Apparatus and method for making composition strips. No. 2,072,-105. Albert C. Fischer, Chicago, Ill.

Specific gravity indicating device. No. 2,072,162. Joe Emil George Eurich, West Didsbury, Manchester, England, to USL Battery Corp., Niagara Falls, N. Y.

Liquid level indicator. No. 2,072,223. Robert C. Scott, Cambridge, Mass.

Method making a pressure vessel shell. No. 2,072,273. Casin W. Obert, Mt. Vernon, N. Y., to Union Carbide & Carbon Corp., New York City.

Apparatus for inclosing objects in regenerated cellulose. No. 2,072,-329. John H. Grady and Joseph W. Clarke to J. H. Grady Mfg. Co., all of St. Louis, Mo.

Apparatus for producing water gas. No. 2,072,357. Hiram J. Carson, Omaha, Nebr.

Centrifugal machine. No. 2.072,377. Edwin Morrison, Denver, Colo.

Method and apparatus for proportioning combustible fluids. No. 2,072,-384. Edwin X. Schmidt, Whitefish Bay, Wis., to Cutler-Hammer, Inc., Milwaukee, Wis.

Mercury vapor rectifier. No. 2,072,404. Louis Leroy to Forges & Ateliers de Constructions Electriques de Jeumont, Societe Anonyme, both of Paris, France.

Method of and apparatus for controlling the flow of fluids. No. 2,072,-442. Ernest Victor Collins, St. Albans, N. Y., to Delaware, Lackawanna & Western Coal Co., New York City.

Specific gravity indicator. No. 2,072,553. Clarence J. Graves, John L. Rupp, and Edgar W. Breisch, Lancaster, N. Y., to Gould Storage Battery Corp., St. Paul, Minn.

Well pumping apparatus. No. 2,072,595. Loyd E. Hutchison, Houston, Texas.

Method of and apparatus for heating and vaporizing liquids. No. 2,072,713. Clyde H. Folmsbee, Berwick, and Henry W. Le Boutillier and Fred. Hess, Tredyffrin Township, Chester Co., Pa.

A compensated flow control for fluids of varying viscosity. No. 2,072,-761. Walter O. Lum to General Electric Co., both of Schenectady, N. Y.

Apparatus for spraying pulverized materials. No. 2,072,845. Francois Philippe Charles Benoit, Paris, France.

Apparatus for introducing chemicals in a batch of water. No. 2,072,-976. Orrin E. Andrus, Milwaukee, Wis.

Liquid purifying apparatus and process. No. 2,073,026. Paul B. Renfrew and Raymond W. Bond to S. F. Bowser & Co., Inc., all of Ft. Wayne, Ind.

Pressure vessels for use at low temperatures made from a low carbon steel. No. 2,073,053. Jesse C. Ducommun, Hammond, Ind., and Joseph W. Yant, East Chicago, Ind., to Standard Oil Co., Chicago, Ill.

Device for determining color density of liquids. No. 2,073,223. Hilton W. Rose, Seattle, Wash.

Mercury vapor detector. No. 2,073,531. Thos. H. Swisher, Scotia, N. Y., to General Electric Co., Schenectady, N. Y.

Pulverulent material treating apparatus. No. 2,073,549. Edward Butts, Georgetown, Colo.

Apparatus for effecting chemical reactions by the aid of a regenerative contact mass. No. 2,073,638. Eugene J. Houdry, Paris, France, to Houdry Process Corp., Dover, Del.

Apparatus for supplying adhesive-coated and comminuted solid material to a spray device. No. 2,073,779. Svend Bramsen to Binks Mfg. Co., both of Chicago, Ill.

Acetylene generator feed valve vibrator. No. 2,073,785. Maurice P. De Motte, Indianapolis, Ind., to Union Carbide & Carbon Corp., New York City.

*Patents digested include issues of the "Patent Gazette," February 23 through middle March 16.*

### Cellulose

Manufacture organic acid esters of cellulose. No. 2,071,333. Camille Dreyfus, New York City, and Herbert E. Martin, Cumberland, Md., to Celanese Corp. of America, corporation of Del.

Manufacture cellulose derivatives with the aid of an organic acid anhydride. No. 2,072,249. Henry Dreyfus, London, England.

Chemical stabilization of cellulose esters. No. 2,072,260. Clifford I. Haney, Drummondville, Que., Canada, to Celanese Corporation of America, corporation of Del.

Esterification of cellulose. No. 2,072,261. Clifford I. Haney, Drummondville, Que., Canada, to Celanese Corp. of America, corporation of Del.

Manufacture organic esters of cellulose. No. 2,072,270. Herbert E. Martin, Cumberland, Md., to Celanese Corp. of America, corporation of Del.

Purification of cellulosic material. No. 2,072,487. Francis H. Snyder to Snyder Maclaren Processes, Inc., both of New York City.

Process of digesting cellulose in which a gaseous medium is introduced. No. 2,072,776. Sjune Svensson, Hissmofors, Sweden.

Cellulose ether recovery. No. 2,073,002. Wm. R. Collings and Walter J. LeFevre to Dow Chemical Co., all of Midland, Mich.

Cellulose derivative products; liquid and solid compositions in which the base material consists of cellulose esters of lower fatty acids only and cellulose esters of higher fatty acids only. No. 2,073,687. Henry Dreyfus, London, England.

### Coal Tar Chemicals

Process of racemizing amino acids. No. 2,071,327. Rudolph S. Bley, Elizabethton, Tenn.

Manufacture perylene; heating a dinaphthyl with anhydrous aluminum chloride in presence of an alkali metal chloride. No. 2,071,468. Friedrich Kuhrmann, Dessau in Anhalt, and Paul Nawiasky and Otto Grosskinsky, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., New York City.

Manufacture naphthalene derivatives. No. 2,072,238. Max Wyler and Arnold Kershaw, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., London, England.

Coal distillation oven. No. 2,072,321. Friedrich Totzek, Essen-Stoppenberg, Germany, to Koppers Co., corporation of Del.

Vertical retort for the carbonization of coal and the like. No. 2,072,-392. Frederick Joseph West and Ernest West to West's Gas Improvement Co., Ltd., all of Manchester, England.

Coke oven door. No. 2,072,537. Paul Van Ackeren, Essen-Ruhr, Germany, to Koppers Co., corporation of Del.

Production para-nitraniline by the reaction of ammonia with the chlorine of para-nitrochlorobenzene in a vessel subject to iron corrosion. No. 2,072,618. Miles A. Dahlen, Wilmington, Del., and Wm. L. Foohey, Penns Grove, N. J., to du Pont, Wilmington, Del.

Method effecting low temperature carbonization of coal to produce coke. No. 2,072,721. Edward Rahm to Albert M. Barr, both of Pittsburgh, Pa.

Method of and apparatus for electrically treating tar emulsions. No. 2,072,917. Wm. Woelflin, Long Beach, Cal., to Petroleum Rectifying Co. of Cal., Los Angeles, Cal.

Method recovering a phenol from an aqueous liquor containing it. No. 2,073,248. Vittorio Molinari, Bound Brook, N. J., to Bakelite Corp., New York City.

Preparation para-tertiary octyl phenol having at least one nitro group substituted in the benzene ring; compound being prepared by the nitration of p-tertiary octyl phenol. No. 2,073,316. Joseph B. Niederl, New York City, to Rohm & Haas Co., Phila., Pa.

### Coatings

Treatment drying or semi-drying oil to produce oxidized oil in liquid phase. No. 2,072,151. Robert D. Bonney, Glen Ridge, and Walter S. Egge, East Orange, N. J., to Congoleum-Nairn, Inc., corporation of New York.

Method of covering objects with sheet regenerated cellulose or the like. No. 2,072,330. John H. Grady and Joseph W. Clarke to J. H. Grady Mfg. Co., all of St. Louis, Mo.

Coating composition adapted for the manufacture of a highly moisture-resistant, non-blushing sheet or film, composed of cellulose acetate stearate, glycerol tristearate, ester gum, normal butyl acetate. No. 2,073,310. Carl J. Malm and Chas. R. Fordyce, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Decorating metallic surfaces; using a coating of lacquer or varnish during process. No. 2,073,624. Lloyd V. Casto, Detroit, Mich.

### Dyes, Stains, etc.

Production dyestuffs of the fluorindine series. No. 2,071,372. Arthur Wolfram and Kurt Bonstedt, Frankfort-am-Main, Germany, to General Aniline Works, Inc., New York City.

Production homogeneous dye mixture of two or more dyestuffs. No. 2,071,492. Spencer U. Boehmer, Lombard, Ill.

Production hydroxycarbazole carboxylic acid arylamides. No. 2,071,702, Friedrich Muth, Leverkusen-I.G.-Werk, Germany, to General Aniline Works, Inc., New York City.

Production trimethine cyanine dyes. No. 2,071,993. Walter Zeh, Dessau in Anhalt, Willi Gaedke, Hofheim in Taunus, Martin Dabelow, Frankfort-am-Main-Hochst, and Werner Zerweck, Frankfort-am-Main-Fechenheim, Germany, to Agfa Ansco Corp., Binghamton, N. Y.

Process dyeing cellulose, cotton, etc., using an alkali salt of a sulfonic acid of a fluorindine compound. No. 2,072,062. Arthur Wolfram and Kurt Bonstedt, Frankfort-am-Main, Germany, to General Aniline Works, Inc., New York City.

Production anthraquinone dyestuffs. No. 2,072,259. Norman Hulton Haddock, Frank Lodge, and Colin Henry Lumsden, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., London, England.

Production water insoluble azo dyestuffs. No. 2,072,288. Werner Zerweck and Max Schubert, Frankfort-am-Main-Fechenheim, Germany, to General Aniline Works, Inc., New York City.

Dyeing machine. No. 2,072,323. Wm. Marcy Wentz, Milwaukee, Wis.

Preparation phenyl-pyridinium sulfonic acid dyestuffs. No. 2,072,401. Ernst Koenigs, Breslau, and Edgar Ruppelt, Waldenburg, Germany, to General Aniline Works, Inc., New York City.

Production vat dyestuffs of the anthraquinone series. No. 2,072,485. Roland Scholl and Joachim Donat, Dresden, and Kurt Meyer, Berlin-Zehlendorf, Germany.

Production acid triphenylmethane dyestuffs. No. 2,072,539. Paul Wolff and Wilhelm Werner, Frankfort-am-Main, Germany, to General Aniline Works, Inc., New York City.

Production trisazo dyestuffs. No. 2,073,000. Heinrich Clingestein, Cologne-am-Rhine, and Eugen Glietenberg and Oskar Goos, Leverkusen-I. G.-Werk, Germany, to General Aniline Works, Inc., New York City.

Process for effecting carbazole ring formation of compounds of the anthraquinone series. No. 2,073,022. Walter Mieg and Franz Wieners, Opladen, Germany, to General Aniline Works, Inc., New York City.

Production dyestuffs of the xanthone type. No. 2,073,086. Carl Winter and Emil Kern, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., New York City.

Separation of vat dyestuff isomers of the naphthoylene diarylimidazole series. No. 2,073,098. Wilhelm Eckert and Heinrich Sieber, Frankfort-am-Main-Hochst, Germany, to General Aniline Works, Inc., New York City.

Preparation N-(aminoalkyl)-anthranilic acid alkyl esters. No. 2,073,-099. Otto Eisleb, Hofheim-in-Taunus, Germany, to Winthrop Chemical Co., Inc., New York City.

Preparation N-aminoalkylamides of N-alkylamino-benzoic acids. No. 2,073,100. Otto Eisleb, Hofheim-in-Taunus, Germany, to Winthrop Chemical Co., New York City.

Vat dyestuff preparations. No. 2,073,116. Jos. Nuesslein and Gerhard Balle, Frankfort-am-Main, Germany, to General Aniline Works, Inc., New York City.

Production mono azo dyestuffs. No. 2,073,470. Richard Fleischhauer, Frankfort-am-Main-Fechenheim, Germany, to General Aniline Works, Inc., New York City.

Production ethane dithio ethers. No. 2,073,589. Walter Reppe and Fritz Nicolai, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Preparation heterocyclic hydrazine compounds. No. 2,073,600. Otto Bayer, Leverkusen-I.G.-Werk, Ernst Herdieckerhoff, Opladen, near Cologne, and Hans Schindhelm, Frankfort-am-Main-Fechenheim, to I. G., Frankfort-am-Main, Germany.

Preparation color compounds; heating a high molecular cyclic ketone with a reducing metal. No. 2,073,662. John M. Tinker, So. Milwaukee, and Viktor M. Weinmayr, Milwaukee, Wis., to du Pont, Wilmington, Del.

Manufacture chromatable yellow azo dyestuffs; coupling diazo compounds obtainable from sulfarylides with pyrazolones. No. 2,073,728. Jakob Bohi to Chemical Works formerly Sandoz, both of Basel, Switzerland.

## Explosives

Safety ignition mixture, ignitable by friction on friction surfaces, consisting of mixture of substances yielding oxygen, semi-pyrophoric iron, zinc dust, abrasive substances, and binding agents. No. 2,071,710. Alfred Schmid, Berlin-Dahlem, Germany, to Oswald F. Wyss, Zurich, Switzerland.

Slow-burning powder for fuses, etc.; consisting of black powder modified by the addition of titanium dioxide. No. 2,072,719. David E. Pearsall, Pittsburgh, Pa., to Ensign-Bickford Co., corporation of Conn.

Slow-burning powder for fuses, etc., consisting of black powder modified by the addition of a metal sulfate. No. 2,072,720. David E. Pearsall, Pittsburgh, Pa., to Ensign-Bickford Co., corporation of Conn.

Manufacture signal torch; fuzee mixture containing oxidizing ingredient treated with nitro-cellulose lacquer. No. 2,073,530. Harry E. Sherman, Alton, Ill., to Equitable Powder Co., East Alton, Ill.

## Fine Chemicals

Sensitizing photographic emulsions; material comprising a silver halide emulsion containing a dye. No. 2,071,374. Walter Zeh, Dessau in Anhalt, Willi Gaedke, Hofheim in Taunus, Martin Dabelow, Frankfort-Hochst, and Werner Zerweck, Frankfort-Fechenheim, Germany, to Agfa Ansco Corp., Binghamton, N. Y.

Manufacture support for photographic layers. Nos. 2,071,462-3. Max Hagedorn and Armin Ossenbrunner, Dessau in Anhalt, and Gustav Wilmanns, Wolfen Kreis Bitterfeld, Germany, to Agfa Ansco Corp., Binghamton, N. Y.

Production photographic dyestuff images. No. 2,071,688. Bela Gaspar, Brussels, Belgium.

Production layers with metal images from light-sensitive metal halide layers. No. 2,071,821. Emil Eduard Eckardt, Dresden, Germany.

Preparation gelatino-silver halide photographic emulsions containing an unsymmetrical polymethine dyestuff. Nos. 2,071,898-9. Henry Alfred Piggott, Cheadle Hulme, and Ernest Harry Rodd, Brooklands, England, to I. C. I., Ltd., London, England.

Preparation halogen derivatives of *a*-ethyl propyl cresols. No. 2,071,-939. Geo. W. Raiziss and LeRoy W. Clemence, Phila., Pa., to Abbott Labs., No. Chicago, Ill.

Production thiazole trimethine cyanines. No. 2,071,994. Walter Zeh, Dessau, Willi Gaedke, Hofheim in Taunus, Martin Dabelow, Frankfort-am-Main-Hochst, and Werner Zerweck, Frankfort-am-Main-Fechenheim, Germany, to Agfa Ansco Corp., Binghamton, N. Y.

Preparation condensation product of cinchona bark alkaloid. No. 2,072,003. Geo. Lutz, Rocky River, O., to du Pont, Wilmington, Del.

Production cinchona bark alkaloid derivative. No. 2,072,004. Geo. Lutz, Rocky River, O., to du Pont, Wilmington, Del.

Manufacture aromatic carboxylic derivatives; condensing a polyhydric aromatic compound with an alkylarylurea chloride in presence of an aluminum halide condensing agent. No. 2,072,237. Max Wyler and Arnold Kershaw, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., London, England.

Preparation 4,6-dinitro-2,3,5-trimethyl 1-tertbutyl benzene, comprising yellow crystals of M. P. 136-136.5° having a musk-like odor. No. 2,072,-293. Marion Scott Carpenter, Nutley, N. J., to Givaudan-Delawanna, Inc., New York City.

Manufacture N-methyl-C,C-allyl-isopropyl-barbituric acid. No. 2,072,-829. Otto Schnider, Basel, Switzerland, to Hoffmann-LaRoche, Inc., Nutley, N. J.

Preparation naphthoxo-trimethine cyanines. No. 2,072,908. Wilhelm Schneider, Dessau-in-Anhalt, Germany, to Agfa Ansco Corp., Binghamton, N. Y.

Production citric acid. No. 2,072,919. Justin Zender, Ardsley, N. Y., to Stauffer Chemical Co., New York City.

Photographic duplicating process. No. 2,073,033. Geza Szasz, Berlin, Germany.

Production of photo-like multi-toned prints. No. 2,073,212. Friedrich Lierg, Vienna, Austria, to Jasma A. G., Zurich, Switzerland.

Photographic processing tank. No. 2,073,306. Carter J. Hughey, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Method transferring a colored image formed by ink or pigment on a fibrous foundation onto a second foundation; second foundation being coated with an adhesive. No. 2,073,387. Albert P. d'Andrea, Brooklyn, N. Y.

Method of removal of excess halides from photographic developing baths. No. 2,073,621. Jesse M. Blaney, Amityville, N. Y.

Method regenerating photographic developer solutions. No. 2,073,664. Louis Weisberg and Willard F. Greenwald, New York City, to Willard F. Greenwald.

Production diphenyl derivatives. No. 2,073,683. Walter G. Christiansen, Glen Ridge, N. J., Sidney E. Harris, Lynbrook, N. Y., and John Lee, Zurich, Switzerland, to E. R. Squibb & Sons, New York City.

## Glass, Ceramics

Purification of silica sands by treatment with a warm aqueous solution containing an alkali acid oxalate and a crystalline ferrous sulfate. No. 2,071,720. Frederick Wm. Adams, Ealing, England, one-half to Rockware Glass Syndicate, Ltd., London, England.

Manufacture transparent, heat-resisting boro-silicate glass containing fluorine, chlorine, and silica. No. 2,072,207. Harrison P. Hood of Corning Glass Works, both of Corning, N. Y.

Embedding mass; comprising a ceramic substance hardening on burning, a substance capable of forming a hardening phosphate, and a practically alkali-free substance yielding phosphoric acid ions in presence of a solvent. No. 2,072,212. Walter Moosdorf, Cologne, and Paul Wolski, Leverkusen-Wiesdorf, Germany, to Winthrop Chemical Co., Inc., New York City.

Ceramic tile composition, consisting of a magnesia-containing mineral, ground common glass, and clay. No. 2,072,466. Andrew Malinovszky, South Gate, Cal., to Malinite Corp., Los Angeles, Cal.

Laminated plate glass. No. 2,072,583. Earl L. Fix, New Kensington, and Brook J. Dennison, Tarentum, Pa., to Duplate Corp., corporation of Del.

Ceramic composition adapted for use in plastic pressing and jiggering; composed of clay, a material from the pyrophillite, tremolite, actinolite, sepiolite and talc group, and a matrix material high in alkalies. No. 2,073,136. Albert Lee Bennett, Glendale, Cal., to Malinite Corp., Los Angeles, Cal.

Apparatus for cleaning of ceramic articles. No. 2,073,184. Howard V. Schweitzer, Cleveland, O.

## Industrial & Heavy Chemicals

Method recovering phthalic anhydride. No. 2,071,329. Ralph Lyman Brown, Syracuse, N. Y., to Solvay Process Co., New York City.

Recovery of phthalic anhydride or acid. No. 2,071,357. Frank Porter, Syracuse, N. Y., to Solvay Process Co., New York City.

Preparation of phthalic anhydride by the catalytic oxidation of naphthalene in vapor phase. No. 2,071,361. Donald A. Rogers, Petersburg, Va., and Frank Porter, Syracuse, N. Y., to Solvay Process Co., New York City.

Manufacture polyhydric alcohols. No. 2,071,395. Henry Dreyfus, London, England.

Treatment calcium magnesium chloride. No. 2,071,417. Peter R. Martin to Fuel Treating Products Co., both of Chicago, Ill.

Purification polyglycerol esters; using aqueous solution of sodium sulfate in process. No. 2,071,459. Reginald Furness, Warrington, England, to Lever Bros., Ltd., Port Sunlight, England.

Apparatus for producing sulfur dioxide. No. 2,071,534. Harold O. C. Ingraham, Greenwich, Conn., to General Chemical Co., New York City.

Production fuming sulfuric acid having a high concentration. No. 2,071,598. Conway Baron von Girsewald, Wolfhart Siecke, and Max Wohlwill, Frankfort-am-Main, Germany, to American Lurgi Corp., New York City.

Volumetric analysis apparatus. No. 2,071,697. Clifford P. Larrabee, Pittsburgh, Pa.

Production tetrahydrofurfuryl alcohol. No. 2,071,704. Wilhelm Normann and Hermann Prückner to Bohme Fettchemie Gesellschaft mit beschrankter Haftung, both of Chemnitz, Germany.

Apparatus and process for producing hydrogen. No. 2,071,721. Glen D. Bagley, Great Neck, and Hendrik W. B. de W. Erasmus, Long Island City, N. Y., to Union Carbide & Carbon Corp., New York City.

Apparatus for utilizing blocks of carbon dioxide ice. No. 2,071,728. Hans Bursitzky, Strausberg, near Berlin, Germany.

Separation gaseous mixtures into components. No. 2,071,763. Franz Pollitzer, Grosshesselohe, near Munich, Germany, to Union Carbide & Carbon Corp., New York City.

Manufacture hydrofluoric acid-ammonia composition. No. 2,071,816. Tom Cummings, Brooklyn, N. Y., to General Chemical Co., New York City.

Preparation a micro-organism devitalizing composition of matter containing a compound from the meta-trifluormethyl-phenyl-azo-meta-phenylenediamine class, and the acid addition salts thereof. No. 2,071,875. Max Engelmann to du Pont, both of Wilmington, Del.

Preparation N-alkoxyalkyl aryl sulfonamides; reacting aryl sulfonamide with an alkoxyalkyl halide in presence of an alkali metal hydroxide. No. 2,071,917. Bozetech C. Bren, Cedar Grove, N. J., to du Pont, Wilmington, Del.

Dry method of improving color of precipitated blanc fixe. No. 2,071,-938. James B. Pierce, Jr., to Barium Reduction Corp., both of Charleston, W. Va.

Production silicic acid gels. No. 2,071,987. Earl S. Ridler, Shaker Heights, O., to du Pont, Wilmington, Del.

Separation crystallized Glauber's salt from mother liquor by gravitational forces. No. 2,071,998. Otto H. Buse, Shaker Heights, O., to du Pont, Wilmington, Del.

Production alkyl substituted aryl hydrocarbons. No. 2,072,061. Chas. A. Thomas, Wayne, Pa., to Sharples Solvents Corp., Phila., Pa.

Method purifying pyrophyllite. No. 2,072,063. Wm. H. Alton to R. T. Vanderbilt Co., both of New York City.

Manufacture methylamine; subjecting mixture of hydrogen and hydrogen cyanide to reaction in the vapor phase in presence of a cyanide of a hydrogenating metal. No. 2,072,247. Henry Dreyfus, London, England.

Process and apparatus for producing comminuted sulfur. No. 2,072,-263. Arthur B. Jones to Industrial Associates, Inc., both of New York City.

Production chlorinated trialkyl amines. No. 2,072,348. Kyle Ward, Jr., to Hercules Powder Co., both of Wilmington, Del.

Dissolving apparatus. No. 2,072,385. Simon Bernard Schwartz to Myles Salt Co., Ltd., both of New Orleans, La.

Preparation pseudopimaric acid by treating rosin oil with an aqueous solution of an alkali. No. 2,072,628. Edward A. Brennan, Savannah, Ga., Stanley E. Cairncross, Palisades Park, N. J., Torsten Hasselstrom, New York City, and Washington Hull, Savannah, Ga.

Recovery of starch and other products from corn. No. 2,072,633. Robert Edman Greenfield and Harold R. Baker to A. E. Staley Mfg. Co., all of Decatur, Ill.

Stabilization of cellulose xanthate using acetone in process. No. 2,072,738. Harry B. Dykstra to du Pont, both of Wilmington, Del.

Preparation esters of the formula $R^1$-O-CO-$R^2$-CO-O-$R^3$-CO-O-$R^4$. No. 2,072,739. Harry B. Dykstra, Wilmington, Del., and Walter Eastby Lawson, Woodbury, N. J., to du Pont, Wilmington, Del.

Preparation benzyl deacetylated chitin; by reacting benzyl chloride with deacetylated chitin in presence of aqueous sodium hydroxide. No. 2,072,771. Geo. W. Rigby to du Pont, both of Wilmington, Del.

Nuclear halogenated mixed ethers; consisting of compounds in which a chlorinated aryl nucleus and an alkyl group are united to one another by oxygen. No. 2,072,797. Frank M. Clark and Walter M. Kutz, Pittsfield, Mass., to General Electric Co., corporation of New York.

Separation of primary from secondary alcohols. No. 2,072,806. Dennistoun Wood, Jr., Palo Alto, Cal., to du Pont, Wilmington, Del.

Production condensation products from hydroxylated cyclic compounds and acetylene. No. 2,072,825. Walter Reppe and Ernst Keyssner, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Processes for the catalytic hydrogenation of dicarboxylic anhydride. No. 2,072,861. Wm. J. Amend and Euclid W. Bousquet to du Pont, all of Wilmington, Del.

Preparation phenyl-2-butadiene-1,3. No. 2,072,867. Wallace H. Carothers, Fairville, Pa., to du Pont, Wilmington, Del.

Manufacture crystalline zirconium oxide from zirconium silicate. No. 2,072,889. Chas. J. Kinzie and Donald S. Hake, Niagara Falls, N. Y., to Titanium Alloy Mfg. Co., New York City.

Process reacting nitrogen tetroxide with aqueous liquids. No. 2,072,947. Mayor Farthing Fogler and Donald A. Rogers, Petersburg, Va., to Solvay Process Co., New York City.

Preparation halogenated aralkyl-aryl ethers; ethers having an aralkyl group joined to a mononuclear aryl group through an ether oxygen atom and containing a plurality of halogen atoms in each aromatic ring. No. 2,073,010. Harold S. Holt to du Pont, both of Wilmington, Del.

Preparation modified glycerides; using olive oil, glacial acetic acid, hydrogen peroxide, and carbon dioxide in process. No. 2,073,011. Leo P. Hubbuch to du Pont, both of Wilmington, Del.

Production an ester of 1,12-octadecanediol wherein at least one hydroxyl group is esterified by phthalic acid. No. 2,073,031. Caryl Sly to du Pont, both of Wilmington, Del.

Process for washing flue gases containing $SO_2$ and $SO_3$ in two stages. No. 2,073,039. Thos. Owston Wilton, Norman Wilton, Herbert Edw. Jackson Green, and Harold Cornwallis Mann, London, England.

Method of gas purification. No. 2,073,083. Alger L. Ward, Upper Darby, and Claude W. Jordan, Paoli, Pa., to United Gas Improvement Co., Phila., Pa.

Process for regulating the hydrogen ion concentration of fermentation mashes. No. 2,073,125. Hugh R. Stiles to Commercial Solvents Corp., both of Terre Haute, Ind.

Method converting starch in cereal using sulfurous acid solution in process. No. 2,073,342. Walter H. Hart, Winnetka, Ill., to Stein-Hall Mfg. Co., Chicago, Ill.

Manufacture activated magnesium hydroxide. No. 2,073,398. Heinz H. Chesny, San Mateo, Cal., to Marine Chemicals Co., Ltd., San Francisco, Cal.

Method hardening proteins. No. 2,073,666. Christian J. Wernlund. Niagara Falls, N. Y., to du Pont, Wilmington, Del.

Manufacture fatty acid anhydrides. Nos. 2,073,685-6. Henry Dreyfus, London, England.

## Leather

Combination tanning process; treating pickled skins with a water soluble salt of an organic acid, then tanning with a metal tanning agent, and an aldehyde tanning agent. No. 2,071,567. Geo. R. Pensel, Amsterdam, N. Y.

Production a dehydrated galactan from western larch wood freed from tannins, oils, bark and colloids, but containing some of the other soluble materials from the western larch. No. 2,073,616. Solomon F. Acree to Arthur B. Foster, both of Washington, D. C.

## Metals and Ores, Electroplating, etc.

Manufacture alloy steel; adding to steel in molten condition a mixture composed of barium peroxide and barium carbonate. No. 2,071,339. Ben F. Hardesty, Cleveland, O., to Perfection Steel Co., Pittsburgh, Pa.

Impregnating with phosphorus by cementation a metal capable of alloying with phosphorus. No. 2,071,533. Harry K. Ihrig to Globe Steel Tubes Co., both of Milwaukee, Wis.

Friable core for molds. No. 2,071,542. Hobart McKinley Kraner, Bethlehem, Pa., to Corhart Refractories Co., Louisville, Ky.

Abrading apparatus. No. 2,071,563. Edw. R. Newcomb, Niagara Falls, N. Y., and Herbert R. Stratford, Cleveland, O., said Newcomb assignor to Carborundum Co., Niagara Falls, N. Y.; said Stratford assignor to Stratmore Co., Cleveland, O.

Method determining inherent grain size of steel. No. 2,071,680. Wm. Darke Brown and Chas. V. Foerster, Jr., both of Pittsburgh, Pa.

Apparatus and method for fusion welding. No. 2,071,808. James L. Anderson, Tenafly, N. J., to Air Reduction Co., New York City.

Manufacture low carbon iron alloys. No. 2,071,942. Wilhelm Rohn, to Heraeus-Vacuumschmelze A. G., both of Hanau-am-Main, Germany.

Process cleaning and pickling metals; subjecting metal to action of an acid cleaning solution in presence of a substituted thiourea containing a hydrogenated aryl group. No. 2,071,966. Elmer K. Bolton to du Pont, both of Wilmington, Del.

Inhibitor for pickling and cleaning solutions; consisting of grain steep water, sulfurized grain steep water, and thiosulfate treated grain steep water. No. 2,071,989. Myron F. Thomas, Chicago, Ill., to du Pont, Wilmington, Del.

Apparatus and process for wire coating. No. 2,072,060. Randall W. Schultz to Metalloys Co., both of Williamsport, Pa.

Production beryllium alloys. No. 2,072,067. Wm. B. Donahue, Ossining, N. Y., to Feldspathic Research Corp., New York City.

Treatment iron oxide ore. Nos. 2,072,072-3. Frederick A. Hartgen to Reading Iron Co., both of Reading, Pa.

Elements for use in the electro-deposition of chromium. No. 2,072,170. Geo. K. Herzog, New Rochelle, N. Y., to United Chromium, Inc., New York City.

Method tinning a metallic surface and composition therefor. No. 2,072,229. Louis Waitman, Detroit, Mich.

Tungsten-base alloy for points of gold nibs. No. 2,072,368. Alfred Jedele to W. C. Heraeus Gesellschaft mit beschrankter Haftung, both of Hanau-am-Main, Germany.

Process and apparatus for oxidizing molten materials. No. 2,072,375. Jean McCallum to National Lead Co., both of St. Louis, Mo.

Production nickel base alloy; consisting of nickel, iron, cobalt, and carbon. No. 2,072,575. John T. Acker, Queens Village, N. Y., and James R. Wilson, Mountain Lakes, N. J., to Bell Telephone Labs., Inc., New York City.

Nickel base alloy made of nickel, carbon, and cobalt. No. 2,072,576. John T. Acker, Queens Village, N. Y., and James R. Wilson, Mountain Lakes, N. J., to Bell Telephone Labs., Inc., New York City.

Tungsten-base alloy for points of gold nibs. No. 2,072,676. Alfred Jedele to W. C. Heraeus Gesellschaft mit beschrankter Haftung, both of Hanau-am-Main, Germany.

Electrolytic apparatus and method. No. 2,072,811. John T. Ellsworth, Ogden, Utah, to Industrial Development Corp., Boston, Mass.

Flotation apparatus. No. 2,072,880. Edward H. Hoag, Los Angeles, Cal.

Apparatus for concentration of ores. No. 2,072,907. Lewis G. Rowand, Brooklyn, N. Y.

Production alloy comprising chromium, nickel, cobalt, and beryllium. No. 2,072,910. Enrique G. Touceda to Consolidated Car Heating Co., Inc., both of Albany, N. Y.

Production alloy comprising chromium, nickel, cobalt, molybdenum, and beryllium. No. 2,072,911. Enrique G. Touceda to Consolidated Car Heating Co., Inc., both of Albany, N. Y.

Process purifying aluminum and magnesium and their alloys. No. 2,073,018. Henry Lepp, Cabourg, France, to Compagnie Generale d'Electro-Metallurgie, Paris, France.

Purification of metals and metallic alloys. No. 2,073,019. Henry Lepp, Cabourg, France, two-thirds to Compagnie Generale d'Electro-Metallurgie, Paris, France, and one-third to Societe d'Electro-Chimie, d'Electrometallurgie et des Acieries Electriques d'Ugine.

Method improving physical and mechanical properties of alloys. No. 2,073,020. Henry Lepp, Cabourg, France, two-thirds to Compagnie Generale d'Electro-Metallurgie, Paris, France, and one-third to Societe d'Electro-Chimie, d'Electrometallurgie et des Acieries Electriques d'Ugine.

Preparation brazing solder composed of tin, phosphorus, and copper. No. 2,073,077 Cyril Stanley Smith, Cheshire, Conn., to American Brass Co., Waterbury, Conn.

Improved method froth flotation of minerals. No. 2,073,148. Ernest Gayford and Jos. Howard Heginbotham, Salt Lake City, Utah, and Philip D. P. Hamilton, Toronto, Ont., Canada, to General Engineering Co., corporation of Utah.

Continuous method for fabricating metallic elements; using metallic adhesive in process. No. 2,073,334. Alden W. Coffman to H. H. Robertson Co., both of Pittsburgh, Pa.

Production welding electrode formed of an alloy containing 0.02 to 0.5% silver, the balance copper. No. 2,073,371. Franz R. Hensel to P. R. Mallory & Co., Inc., both of Indianapolis, Ind.

Production ferro-magnetic alloy; permanent magnet steel comprising cobalt, chromium, tungsten, uranium, and iron. No. 2,073,455. Walter E. Remmers, Western Springs, Ill., to Western Electric Co., Inc., New York City.

Method effecting concentration of minerals by flotation; subjecting mineral pulp to flotation operation in presence of a terpene mercaptan. No. 2,073,492. Philip A. Ray to Hercules Powder Co., both of Wilmington, Del.

Ore concentrating table. No. 2,072,594. Chas. F. Hutchings, San Francisco, Cal.

Production magnesium base alloy composed of magnesium and about 1% barium. No. 2,073,515. Edw. F. Fischer, Cleveland, O., to Magnesium Development Corp., corporation of Del.

Process and apparatus for refining mineral oils. No. 2,073,622. David G. Brandt, Westfield, N. J., to Doherty Research Co., New York City.

Metal recovery process. No. 2,073,631. Harvey N. Gilbert, Niagara Falls, N. Y., to du Pont, Wilmington, Del.

Method treating the positive lead peroxide pasted plates of lead acid cells; using oxalic and sulfuric acids in process. No. 2,073,734. Jeremiah Alphonsus Downing, Cork, Irish Free State, to D. & B. Electrical Co., Ltd., London, England.

Method corrosion protection, by chemical reaction of a pickling acid. No. 2,073,783. Frank W. Corkery, Clairton, Pa., to Pennsylvania Industrial Chemical Corp., corporation of Pa.

## Paper and Pulp

Method coating paper with a melted compound pitch having high melting point. No. 2,071,360. James Reid, Darien, Conn.

Digesting method and apparatus. No. 2,072,086. Joaquin Julio de la Roza, Sr., Great Neck, N. Y., to de la Roza Corp., Wilmington, Del.

Manufacture and refinement of chemical pulps and regeneration of the spent chemical liquors. No. 2,072,177. Hugh K. Moore to Brown Co., both of Berlin, N. H.

Manufacture starch-sized papers. No. 2,072,179. Oscar F. Neitzke, Belmont, Mass., to Bennett, Inc., Cambridge, Mass.

Reducing dusting in manufacture of coated paper; using a coating containing an adhesive liquid fraction and an insoluble solid fraction. No. 2,072,670. Louis C. Fleck, Appleton, Wis., to K. C. M. Co., Dayton, O.

Method washing and thickening paper pulp stock. No. 2,073,654. Lloyd D. Smiley to Smiley Industrial Filter Co., both of Dayton, O.

Production safety paper containing a salt of a p,p'-diaminodiphenylthiourea adapted to react to produce a visible discoloration upon the application of a chemical ink eradicator. No. 2,073,762. Burgess W. Smith to Todd Co., Inc., both of Rochester, N. Y.

Production safety paper containing a salt of p,p'-diaminodiphenyl sulfide. No . 2,073,763. Burgess W. Smith to the Todd Co., Inc., both of Rochester, N. Y.

Manufacture safety paper; adding p.p'-diaminostilbene during or after the formation of the web for purpose of producing, by its reaction, a visible indication of the use of an ink eradicator. No. 2,073,764. Burgess W. Smith to The Todd Co., Inc., both of Rochester, N. Y.

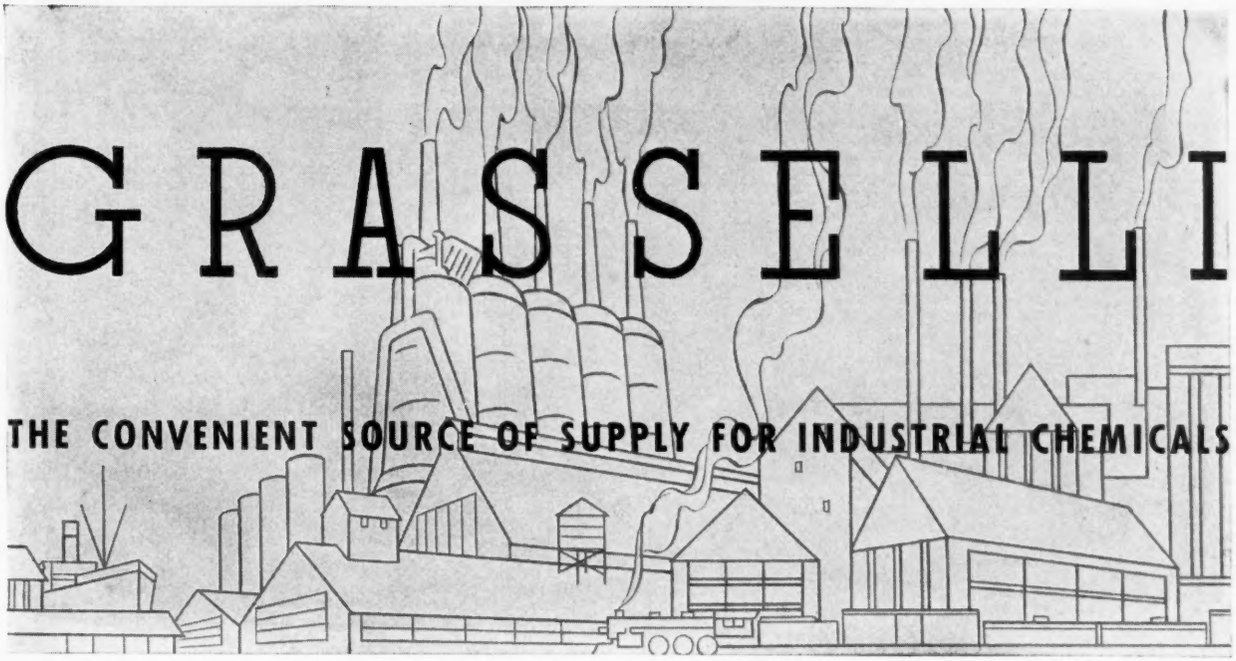
## Petroleum and Petroleum Chemicals

Apparatus and method for fractionating hydrocarbon oils. No. 2,071,429. Edw. G. Ragatz to Union Oil Co. of Calif., both of Los Angeles, Cal.

Dyed lubricating oil. No. 2,071,481. Carl Winning and Stewart C. Fulton, Elizabeth, N. J., to Standard Oil Development Co., corporation of Del.

Production fluorescence producing substances soluble in hydrocarbon oils. No. 2,071,521. Hans Hartmann and Hans Rabe, Mannheim, Germany, to I. G., Frankfort-am-Main, Germany.

Filter for lubricating oil. No. 2,071,529. Frank A. Howard, Elizabeth, N. J., to Standard Oil Development Co., corporation of Del.

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Extraction light mineral oil distillates with sulfur dioxide. No. 2,071,590. Ernest W. Thiele and Fred W. Scheineman to Standard Oil Co., all of Chicago, Ill.

Lubricating device. No. 2,071,615. John L. Creveling, near Tucson, Ariz., to Lubrication Corp., So. Bend, Ind.

Apparatus for distilling oil. No. 2,071,643. Frank L. Maker, Berkeley, Cal., to Standard Oil Co. of Cal., San Francisco, Cal.

Improved method cracking hydrocarbons. No. 2,071,723. Kenneth Albert Beach, Chester, Pa., to Sinclair Refining Co., New York City.

Production a metal naphthenate. No. 2,071,862. Gerald M. Fisher, Los Angeles, Cal., to Socony-Vacuum Oil Co., Inc., New York City.

Production unsaturated alcohols from allyl type unsaturated halides. No. 2,072,015. Miroslav W. Tamele and Herbert Peter Augustus Groll, Berkeley, Cal., to Shell Development Co., San Francisco, Cal.

Production allyl alcohol. No. 2,072,016. Miroslav W. Tamele, Oakland, and Herbert P. A. Groll, Berkeley, Cal., to Shell Development Co., San Francisco, Cal.

Destructive distillation liquid hydrocarbon oils. No. 2,072,039. Alfred Knudsen, Astra (Chubut), Argentina.

Decolorizing dark colored naphthenic acids by treatment with concentrated sulfuric acid. No. 2,072,053. Waldersee B. Hendrey, Beacon, N. Y., to Texas Co., New York City.

Process for breaking a petroleum emulsion of the water-in-oil type. No. 2,072,085. Melvin De Groote, St. Louis, and Bernhard Keiser, Webster Groves, Mo., to Tretolite Co., Webster Groves, Mo.

Hydrocarbon oil treatment. No. 2,072,104. Seymour W. Ferris, Aldan, Pa., to Atlantic Refining Co., Phila., Pa.

Preparation lubricating composition; comprising a hydrocarbon base oil containing in solution a thickening polymer of the non-asphaltic chain type comprising alternate aromatic rings and aliphatic chains. No. 2,072,107. Stewart C. Fulton and Louis A. Mikeska, Elizabeth, N. J., to Standard Oil Development Co., corporation of Del.

Production light or low boiling hydrocarbons from crude oil or the equivalent. No. 2,072,108. Eugene J. Houdry, Woodbury, N. J., to Houdry Process Corp., Dover, Del.

Improved resinous material soluble in hydrocarbon oils; alkylating a resinous material containing a reactive aromatic group. No. 2,072,120. Louis A. Mikeska and Stewart C. Fulton, Elizabeth, N. J. to Standard Oil Development Co., corporation of Del.

Conversion hydrocarbon oils. No. 2,072,123. Edwin F. Nelson to Universal Oil Products Co., both of Chicago, Ill.

Process of and apparatus for converting hydrocarbon oils in the vapor phase. No. 2,072,131. Albert P. Sachs, Brooklyn, N. Y., to Petroleum Conversion Corp., New York City.

Measurement and control of the flow of viscous fluids. No. 2,072,204. Harry G. Geissinger, Detroit, Mich.

Mixing and atomizing apparatus for hydrocarbons and other fluids. No. 2,072,281. Raymond Felix Simonin to Societe d'Etudes des Procedes Simonin, both of Dijon, France.

Conversion and coking of hydrocarbon oils. No. 2,072,378. Edwin F. Nelson to Universal Oil Products Co., both of Chicago, Ill.

Cracking hydrocarbon oils. No. 2,072,394. Chas. B. Buerger to Gulf Oil Corp., both of Pittsburgh, Pa.

Stabilization hydrocarbon oil distillate to produce stable product of desired vapor pressure. No. 2,072,456. Percival C. Keith, Jr., Peapack, N. J., to Gasoline Products Co., Inc., Newark, N. J.

Conversion hydrocarbon oils. No. 2,072,524. Donald H. Mace, Upper Montclair, N. J., to Texas Co., New York City.

Method of and radiant heat stills for distilling hydrocarbon oils. No. 2,072,535. Donald L. Thomas, New York City, to Gasoline Products Co., Inc., Newark, N. J.

Production anti-knock gasoline. No. 2,072,745. Louis H. Fitch, Jr., Bartlesville, Okla., The First Nat'l Bank in Bartlesville, administrator of said Fitch, deceased, to Phillips Petroleum Co., corporation of Del.

Hydrocarbon conversion process. No. 2,072,789. Isaac Arthur Anson, Tulsa, Okla.

Process for effecting the pyrogenic conversion of gaseous hydrocarbons in metallic apparatus. No. 2,072,801. Wright W. Gary, Great Neck, N. Y., to Gasoline Products Co., Inc., Newark, N. J.

Conversion hydrocarbon oil into relatively low-boiling hydrocarbon oil suitable for use as motor fuel. No. 2,072,805. Pike H. Sullivan, New Rochelle, N. Y., to Gasoline Products Co., Inc., Newark, N. J.

Fractionating petroleum oil vapors to produce a plurality of fractional condensates therefrom. No. 2,072,834. Angus R. Blakey, So. Orange, N. J., to Doherty Research Co., New York City.

Method of and apparatus for introducing high potentials into a dehydrator. No. 2,072,918. Wm. Woelflin, Long Beach, Cal., to Petroleum Rectifying Co. of Cal., Los Angeles, Cal.

Stabilization of low boiling hydrocarbon oils and particularly cracked hydrocarbon vapors. No. 2,073,073. Jos. K. Roberts, Hammond, Ind., and Geo. W. Watts, Whiting, Ind., to Standard Oil Co., Chicago, Ill.

Process for lowering pour point of mineral oil. No. 2,073,080. Adrianus Johannes van Peski, Bussum, Netherlands, to Shell Development Co., San Francisco, Cal.

Conversion mercaptans to disulfides in petroleum distillates without the addition of sulfur; subjecting distillates to action of an aqueous solution of an alkali metal plumbate. No. 2,073,147. Frank Gardner, Dallas, Tex.

Apparatus for separation of distillable materials by evaporative distillation. No. 2,073,202. Eric Wm. Fawcett and John Lewis McCowen, Northwich, England, to Imperial Chemical Industries, Ltd., London, England.

Process of intimately mixing sulfuric acid and lubricating oils. No. 2,073,253. Geo. M. Pfau, Dayton C. Bolin, and Ernest W. Zublin to Texas Pacific Coal and Oil Co., all of Ft. Worth, Tex.

Apparatus and method for short-path high-vacuum distillation. No. 2,073,327. Brian Edmund Allen Vigers, Dunstable, England, to Imperial Chemical Industries, Ltd., corporation of Great Britain.

Process for pyrolytic conversion and coking of finely divided solid bituminous material and hydrocarbon oil. No. 2,073,367. Alfred Fisher to Universal Oil Products Co., both of Chicago, Ill.

Preparation oil well drilling fluid containing as weighting agent zinc chloride. No. 2,073,413. Roy Cross and Matthew Forbes Cross, Kansas City, Mo.

Method and apparatus for purifying lubricating oil. No. 2,073,442. Southwick W. Briggs, Washington, D. C.

Continuous fractional distillation hydrocarbon oils. No. 2,073,446. Edward Ellsberg, Westfield, N. J., three-fourths to Tide Water Associated Oil Co., New York City.

Method converting hydrocarbon oil in the vapor phase into motor fuels of the gasoline type. No. 2,073,456. Albert P. Sachs to Petroleum Conversion Corp., both of New York City.

Process of purifying viscoresins. No. 2,073,506. Vanderveer Voorhees, Hammond, Ind., to Standard Oil Co., Chicago, Ill.

Solvent fractionation of gasoline. No. 2,073,517. Ogden Fitz Simons and Wm. Herbert Bahlke, Hammond, Ind., to Standard Oil Co., Chicago, Ill.

Method of hydrofining hydrocarbon distillates. No. 2,073,578. Marion Hayes Gwynn, Leonia, N. J.

Production lubricating oils having a pour point caused by wax therein. No. 2,073,641. Leo Liberthson, New York City, to L. Sonneborn Sons, Inc., corporation of Del.

Motor for oil well pumping system. No. 2,073,809. Herbert M. Salentine, Los Angeles, Cal.

## Resins, Plastics, etc.

Manufacture a flexible transparent article comprising an organic hydrophilic colloid, having incorporated therein a water-soluble salt of an aliphatic nitrogen base with an acid of phosphorus. No. 2,071,558. Willard L. Morgan, Nutley, N. J., to Sylvania Industrial Corp., Fredericksburg, Va.

Manufacture a flexible transparent article comprising regenerated cellulose having incorporated therewith a water soluble salt of a sulfonated aryl derivative of an acid of phosphorus, to effect flameproofing. No. 2,071,559. Willard L. Morgan, Nutley, N. J., to Sylvania Industrial Corp., Fredericksburg, Va.

Production higher aromatic keto fatty acids. No. 2,071,496. Herman A. Bruson, Phila., Pa., Jack D. Robinson, Buffalo, N. Y., and Otto Stein, Phila., Pa., to Resinous Products & Chemical Co., Phila., Pa.

Preparation artificial resin compression mixtures. No. 2,071,523. Richard Hessen, Bautzen, Germany.

Metal fastening for frictional insertion in wood; having coating consisting of a resin of glycerolphthalic acid. No. 2,071,685. Frank H. Ellsworth and Geo. A. Gleason, Worcester, Mass., to American Steel and Wire Co. of N. J., corporation of N. J.

Molding press. No. 2,071,795. Arthur M. Howald, Toledo, O., to Plaskon Co., Inc., corporation of Del.

Production translucency in organic plastic compositions; incorporating therein a highly halogenated diphenyl. No. 2,071,836. Russell L. Jenkins, Anniston, Ala., to Swann Research, Inc., Birmingham, Ala.

Preparation polymers in sheet or block form. No. 2,071,907. Harold James Tattersall, Ardrossan, Scotland, to I. C. I., Ltd., London, England.

Manufacture tear-resistant flexible sheet. No. 2,071,926. Gerald K. Geerlings, Bala-Cynwyd, Pa.

Process of polymerization; a composition containing monomeric methyl methacrylate and a polymerization catalyst. No. 2,071,932. Maurice L. Macht, Jersey City, N. J., to du Pont, Wilmington, Del.

Resinous products or compositions; comprising a polymerized polyhydric alcohol, a crystalline organic carboxylic acid, drying oil acids, and a natural resin. No. 2,072,068. Carleton Ellis to Ellis-Foster Co., both of Montclair, N. J.

Coating composition comprising chlorinated rubber, a heat-treated mixture of a fatty oil, and a xylenol-aldehyde resin soluble in said oil. No. 2,072,069. Carleton Ellis to Ellis-Foster Co., both of Montclair, N. J.

Plastic heat insulating composition, consisting of blue clay, flaxseed meal, green tow, hemp waste, pulverized charcoal, and waste sulfite liquor. No. 2,072,081. Oscar A. Brandt and Duluth Dalenius, Bellingham, Wash.

Manufacture synthetic resins; reacting an aldehyde-polynuclear phenol resin with hydrogen in presence of a hydrogenating catalyst. No. 2,072,142. Richard T. Ubben to du Pont, both of Wilmington, Del.

Manufacture synthetic resins and compositions containing same; hydrogenating an aldehyde-phenol resin in presence of a hydrogenating catalyst. No. 2,072,143. Richard T. Ubben to du Pont, both of Wilmington, Del.

Method forming a continuous, clear, transparent sheet from a mass of plastic material. No. 2,072,145. Jackson B. Wells, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Preparation a water soluble sulfonate of a condensation product of naphthalene and a polymer of isobutylene. No. 2,072,153. Herman A. Bruson, Elkins Park, and Otto Stein, Lansdowne, Pa., to Rohm & Haas, Phila., Pa.

Treatment of porous masses, using formaldehyde in process. No. 2,072,408. Elly Pollak, Vienna, Austria.

Production polyvinyl compounds; subjecting N-vinyl pyrrole compounds to polymerization. No. 2,072,465. Walter Reppe, Ernst Keyssner, and Eugen Dorrer, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Thermoplastic adhesive; comprising composite polymer of vinyl acetate and vinyl chloride, dibutyl phthalate, and chlorinated rubber. No. 2,072,631. Ralph M. Freydberg, New York City, to Acme Backing Corp., Brooklyn, N. Y.

Production synthetic resin comprising reaction product of an alcohol and an acidic composition. No. 2,072,810. Hayward H. Coburn, Springfield, Pa., to Hercules Powder Co., Wilmington, Del.

Production synthetic resin comprising reaction product of an alcohol and an acidic composition. No. 2,072,818. Irvin W. Humphrey to Hercules Powder Co., both of Wilmington, Del.

Production synthetic resin comprising reaction product of an alcohol with a product of the reaction of an abietic acid ester and maleic anhydride. No. 2,072,819. Irvin W. Humphrey to Hercules Powder Co., both of Wilmington, Del.

Manufacture synthetic resins; reacting formaldehyde with the condensation product of a phenol with a halogenated aliphatic ketone. No. 2,072,901. Wm. Henry Moss, London, England, to Celanese Corp. of America, corporation of Del.

Manufacture compositions containing synthetic resins. No. 2,072,902. Wm. Henry Moss, London, England, to Celanese Corp. of America, corporation of Del.

Polymerization methyl methacrylate. No. 2,072,904. Emil D. Ries to du Pont, both of Wilmington, Del.

Manufacture condensation products from non-aliphatic sulfamides and aldehydes. No. 2,072,971. Georg Walter, Vienna, Austria.

Production transformation products of acrylic acid or its derivatives; polymerizing an ester of acrylic acid in presence of a substance which will split off oxygen in the reaction. No. 2,073,619. Walter Bauer and Adolf Gerlach, Darmstadt, Germany, to Rohm & Haas Co., Phila., Pa.

Production methyl amine. No. 2,073,671. Chester E. Andrews, Brookline, Pa., to Rohm & Haas Co., Phila., Pa.

Manufacture glycerides of fatty acids; esterifying glycerol with one or more fatty acids in a solvent composed of one or more monohydric mononuclear phenols. No. 2,073,797. Thos. Percy Hilditch, Brownlow Hill, Liverpool, and John Gordon Rigg, Wallasey, England, to Imperial Chemical Industries, Ltd., London, England.

Production hydroxy acid from a polymeric anhydride; hydrogenating polymeric anhydride to a polyester, then hydrolyzing polyester and recovering the hydroxy acid. No. 2,073,799. Julian W. Hill to du Pont, both of Wilmington, Del.

## Rubber

Manufacture rubber chloride. No. 2,072,255. Erich Gebauer-Fuelnegg, deceased, late of Evanston, Ill., by Marie Gebauer-Fuelnegg, Evanston,

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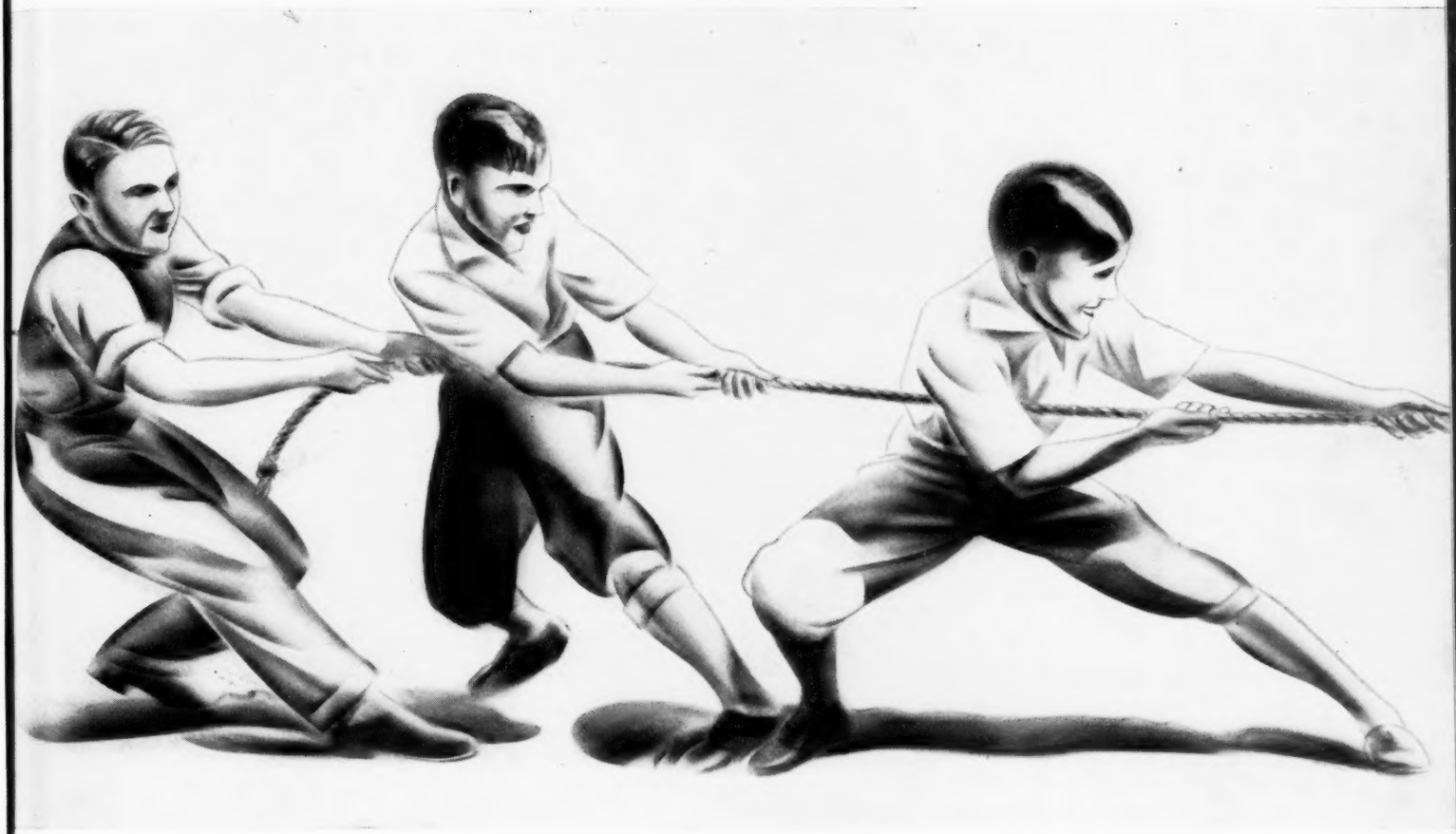

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Ill., administratrix, and Eugene W. Moffett, Gary, Ind., to Marbo Patents, Inc., corporation of Del.

Apparatus for electrically vulcanizing India rubber pieces. No. 2,072,497. Roland Albert Ernest Dupont, Epernay, France.

Preparation rubber-resin dispersions; comprising a cream high in rubber content concentrated from a liquid dispersion of vulcanizable previously coagulated rubber in liquid comprising a normally liquid synthetic resin. No. 2,072,508. Osborne L. Mahlman, Kenmore, and Raymond C. Benner, Niagara, Falls, N. Y., to Carborundum Co., Niagara Falls, N. Y.

Preparation rubber composition containing a tetra alkyl substituted benzidine. No 2,072,596. Webster N. Jones, Akron, O., to B. F. Goodrich Co., New York City.

Apparatus for producing on a plastic body predetermined relatively raised and depressed surface areas. No. 2,072,597. Alexis W. Keen, Passaic, and Henry T. Trautvetter, Clifton, N. J., to U. S. Rubber Products, Inc., New York City.

Transfer web having on its back a thin dense film of chlorinated rubber. No. 2,072,943. Wallace Patten Cohoe to Underwood Elliott Fisher Co., both of New York City.

Preparation butadienyl compounds; reacting a halogen-4-butadiene-1,2 with an alkali metal. No. 2,073,363. Wallace H. Carothers, Fairville, Pa., and Gerard J. Berchet, Wilmington, Del., to du Pont, Wilmington, Del.

### Textile, Rayon

Process and device for degumming ramie and similar fibres. No. 2,071,651. David S. Neill, Genoa, Italy.

Treatment textiles to render them crease-resistant. No. 2,071,419. Wm. Henry Moss, London, England, to Celanese Corp. of America, corporation of Del.

Rayon spinning machine of the pot-spinning type. No. 2,072,023. Harry W. Butterworth, Jr., Phila., Pa., and John Joseph Sippel, Upper Darby, Pa., to H. W. Butterworth & Sons Co., Phila., Pa.

Spinning of artificial filaments. Nos. 2,072,100-2. Camille Dreyfus, New York City, and Wm. Whitehead, Cumberland, Md., to Celanese Corp. of America, corporation of Del.

Manufacture cyclic ethers; subjecting a glycol to action of temperatures between 150-200°C. in presence of hydrogen chloride. No. 2,072,101. Henry Dreyfus, London, England.

Compositions and processes for soaking silk and textiles. No. 2,072,155. Dale S. Chamberlin, Bethlehem, Pa., to Warwick Chemical Co., West Warwick, R. I.

Manufacture artificial textiles. No. 2,072,231. Wm. Whitehead, Cumberland, Md., to Celanese Corp. of America, corporation of Del.

Apparatus for production artificial filaments by the evaporative method. No. 2,072,248. Henry Dreyfus, London, England.

Process for stretching artificial filaments, films, etc., containing organic derivatives of cellulose. No. 2,072,250. Henry Dreyfus, London, England.

Manufacture or treatment of artificial textiles. No. 2,072,251. Henry Dreyfus, London, England.

Production colorations on materials comprising an organic derivative of cellulose. No. 2,072,252. Geo. Holland Ellis, Spondon, near Derby, England, to Celanese Corp. of America, corporation of Del.

Process for increasing the resistance to heat of textiles made of or containing cellulose esters. No. 2,072,253. Geo. Holland Ellis and Alexander James Wesson, Spondon, near Derby, England, to Celanese Corp. of America, corporation of Del.

Manufacture or treatment of textiles, etc., comprising an organic derivative of cellulose. No. 2,072,265. Edgar Bertie Johnson and Robert Pierce Roberts, Spondon, near Derby, England, to Celanese Corp. of America, corporation of Del.

Preparation articles of thermoplastic compositions, containing derivatives of cellulose. No. 2,072,280. Geo. Schneider, Montclair, and Bjorn Andersen, Maplewood, N. J., to Celanese Corp. of America, corporation of Del.

Gilling machine and drawing machine for the treatment of fibrous materials. Nos. 2,072,451-2-3. John Hughes, Rochdale, England.

Production dull-luster bactericidal filament. No. 2,072,808. Rudolph S. Bley, Elizabethton, Tenn., to No. American Rayon Corp., New York City.

Cellulosic spinning solution having bactericidal properties. No. 2,072,809. Rudolph S. Bley, Elizabethton, Tenn., to North American Rayon Corp., New York City.

Device for after treatment of filaments. No. 20,284. Reissue. Conrad Herrmann, Wuppertal-Elberfeld, Germany, to North American Rayon Corp., corporation of Del.

Manufacture delustered extruded artificial filaments or like products containing up to 10% ot finely divided bismuth hydroxide. No. 2,072,856. Camille Dreyfus, New York City, and Wm. Whitehead, Cumberland, Md., to Celanese Corp. of America, corporation of Del.

Production deeply colored cellulosic filaments. No. 2,072,858. Geo. Holland Ellis, Spondon, near Derby, England, to Celanese Corp. of America, corporation of Del.

Production nitrogen-containing cellulose derivatives. No. 2,072,870. Henry Dreyfus, London, England.

Production artificial textiles; using a thermoplastic derivative of cellulose in process. No. 2,072,926. Wm. Ivan Taylor, Spondon, near Derby, England, to Celanese Corp. of America, corporation of Del.

Production artificial textiles. No. 2,072,927. Wm. Ivan Taylor, Spondon, near Derby, England, to Celanese Corp. of America, corporation of Del.

Apparatus for production artificial filaments No. 2,072,928. Wm. Ivan Taylor and Leslie Brisbane Gibbins, Spondon near Derby, England, to Celanese Corp. of America.

Method forming colored films, foils or filaments from a solution of an organic derivative of cellulose containing a dye, said dye being pretreated with an alcoholic solution of an alkali. No. 2,072,931. Wm. Whitehead, Cumberland, Md., to Celanese Corp. of America, corporation of Del.

Manufacture nitrogen-containing cellulose derivatives; reacting with ammonia under anhydrous conditions a cellulose ester of an acid containing an unsaturated aliphatic radicle. No. 2,073,052. Henry Dreyfus, London, England.

Production colored cellulose-ester material; incorporating into a solution of a cellulose-ester in any of the usual organic solvents an ester-salt of a leuco vat dyestuff. No. 2,073,414. Henry Dosne, Mulhouse, Haut-Rhin, France.

Preparation fur, etc., for felting; applying to the fibers hydrogen peroxide of a volume strength between 50 and 200. No. 2,073,452. Warren C. Mercier to American Hatters & Furriers Co., Inc., both of Danbury, Conn.

Reducing lustre of textiles of organic derivatives of cellulose; impregnating with diphenyl, afterwards subjecting materials to action of a hot aqueous medium. No. 2,073,629. Geo. Holland Ellis, Spondon, near Derby, England, to Celanese Corp. of America, corporation of Del.

Processes of treating vegetable fibrous material for the production of cellulose fibre. No. 2,073,682. Franklin R. Chesley, Jr., Saco, Maine.

### Water Treatment

Process sewage treatment. No. 2,071,591. Albert L. Tholin, LaGrange, Ill.

Process and apparatus for treating residue, waste, etc. No. 2,071,835. Leonhard Hermanns, Oberhausen-Sterkrade, Germany, to Gutehoffnungshütte Oberhausen Aktiengesellschaft, Oberhausen-Rhineland, Germany.

Water softening apparatus. No. 2,071,997. Francis Norwood Bard, Highland Park, Ill., to Permutit Co. (1934), Wilmington, Del.

Cyclic process of sewage treatment and sludge disposal. No. 2,072,154. Elmore E. Butterfield, Forest Hills, N. Y.

Water separating device. No. 2,072,206. Russell A. Hetzer, Madeira, Ohio, to American Laundry Machinery Co., Norwood, Ohio.

Removal fluorides from drinking water; contacting acidified water containing fluorides with residual carbon. No. 2,072,376. Ralph H. McKee and Wm. S. Johnston, New York City.

Water filtering and purifying device. No. 2,072,848. James T. Brown, Detroit, Mich.

Process treating sewage in a hermetically enclosed percolating body. No. 2,073,441. Heinrich Blunk, Essen, Germany.

Preparation solutions of organic chlorine compounds. No. 2,073,256. Franz C. Schmelkes, Montclair, and Henry C. Marks, Belleville, N. J., to Wallace and Tiernan Products, Inc., Belleville, N. J.

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# Selenium and Tellurium Recovery Methods

The recovery of selenium and tellurium, as carried out at the Canadian Copper Refineries plant in Montreal East, was described by Dr. J. F. White, at a meeting of the Shawinigan Falls Chemical Association, on January 13.

The blister copper and the anode copper (from the Hudson Bay and Noranda smelters) carries 0.20 to 0.25 per cent. of these elements as selenides and tellurides. In the tank-house they separate to the slimes in the same chemical forms along with copper, gold, silver, etc. The dried slimes are given an acid roast, this operation removing much selenium as the oxide to the scrubber system and making the copper soluble as the sulfate. The tellurium is oxidized to a considerable extent to the tellurite. The "roasted slimes" are given a water leach to remove copper and then are mixed with soda ash, caustic soda and sodium silicate, and charged to the Doré furnace.

### Chemical Treatment of the Metallurgical Slags

During treatment in the Doré furnace, more selenium is fumed off as the oxide, a No. 1 slag is removed and returned to the smelters, a No. 2 slag containing tellurium (and some selenium) as the tellurite and tellurate is removed, and finally the Doré metal containing the gold and silver is removed.

The strongly alkaline No. 2 slag is given a water leach and the filtered solution combined with the acid solution of the scrubber system. This operation gives a "neutralized mud" containing most of the tellurium and some selenium and a "neutralized slag leach" high in selenium and low in tellurium. After filtration, the solution is acidified with sulfuric acid and the selenium precipitated with sulfur dioxide. Selenium is obtained also by the gassing of scrubber solution. This operation yields red selenium; melting of the red selenium gives the vitreous variety and the retorting gives the metallic form. It is sold as the fine powder, approximately 99.5 per cent. pure.

The "neutralized mud" is given a water leach to remove sodium salts. The residue is mixed with sulfuric acid and then dumped to a furnace. Here the bulk of the selenium is roasted off and the copper made soluble. The copper is leached out. The residue is given an acid leach (sulfuric). The acid leach is treated with sodium sulfite to remove the remaining selenium. Salt is added and the solution gassed with sulfur dioxide. After washing, the precipitated tellurium is dried and cast. The product is better than 99.5 per cent. tellurium.—*Canadian Chemistry and Metallurgy*, February, 1937.

# CHEMICAL SPECIALTIES

## HOUSEHOLD
## INDUSTRIAL
## AGRICULTURAL

- Textile Solvents
- Metaphosphates in Hard Water
- Adhesive Removers
- Organic Accelerators
- Trade Marks and Patents
- Cash Ideas
- Association News

Paas Dye Package, redesigned by Martin Ullman, was sufficiently appealing and colorful to put it in the winning group of the 1936 All-America package competition.

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# Solvents in the Textile Trades

## *A Résumé of European Practices*

MODERN methods for cleansing wool are very much improved and new types of solvents are being continually tested. One process which is in use at the present time, on the continent, employs ethyl chloride. By the use of this solvent, wool can be degreased at half the present cost, and the gain of wool is more than one per cent. Another solvent scouring process in use on the continent at the present time uses pure benzene. The wool is first de-suinted by water at 25° to 30° C., and after being dried in a vacuum, it is brought into contact with pure benzene at a temperature of 40° to 42° C. After degreasing, the benzene retained by the wool is distilled off under high vacuum by heat, while the final purification of the wool is completed by running water at a low temperature. For this system it is claimed that the wool does not felt so readily, spins to finer counts, and gives less waste in combing. The loss of solvent is said to be not more than one per cent. of the weight of wool treated, while the danger from explosion is reduced considerably by working at low pressure. The wool is not left harsh or brittle, as about 0.6 per cent. of grease is left adhering to the fibres.

The mixture of grease and benzene from the degreasing process is run through a charcoal filter where the dirt and slime are removed. It is then passed through a calcium chloride filter to remove water, and finally the benzene is distilled for further use, leaving a neutral grease of good quality, low acidity, and a color which comes near to that of commercial lanolins. Another big advantage claimed is that there is no effluent, since the solvent is passed direct to the recovery plant and the bulk is regained for further use. The efficiency of such methods is extremely high, being, according to statistics, from 90 to 93 per cent., while the expenses are comparatively low, as most of the costs can be charged against the scouring plant and not to the grease recovery plant.

The solvent process may ultimately prove to be the ideal method of scouring when both its safety and its efficiency can be guaranteed. It would undoubtedly provide a very satisfactory solution to the effluent problem, and allow the comber to put on the market a grease far superior to the present brown Yorkshire grease.

### Working-Up of Acid-Cracked Brown Grease

The brown grease from the magma or acid-cracking process varies in character according to its source, Merino wools yielding a much softer grease than the cross-bred types. Knowledge of its chemistry is still far from complete owing to its complex nature. Acids and alcohols are present, but all tests prove the absence of glycerol. Cerotic, stearic, palmitic and myristic acids have been detected in the grease, while the non-saponifiable fraction contains cholesterol, iso-cholesterol, cetyl alcohol and ceryl alcohol.

The major portion of the crude grease is destructively distilled, products of great variety being obtained. The stills are heated with free fire until all the moisture has been driven off and super-heated steam is then applied. The first product of this distillation is a light oil known as spirit oil. This is followed by a pale yellow product known as first distilled grease. The next fraction is green oil which is sometimes used for coarse lubricating greases, but is nearly always returned to the still with the next batch of grease. Finally, the distillate comes over as a thick oil. The residue from the still is a pitch, which is used as a lubricant for the necks of hot rollers and as an insulator for electrical cables.

The first distilled grease is usually allowed to seed or crystallize, and is then subjected to pressure in order to obtain a liquid oleine and a solid stearine. The oleine that exudes from the crystallized cake before pressing is usually sold as No. 1 Oil. These oleines are chiefly used in the heavy woolen trade, though a small amount is used in the manufacture of lubricating greases. It is useless for soap making on account of the large percentage of unsaponifiables that it contains. The stearines are chiefly used in the rubber industry and in the manufacture of polishes, while the spirit oils find a limited use in making dark varnishes and in the manufacture of bricks.

### Lanolin Production and Uses

A considerable amount of brown grease from acid cracking is used in the manufacture of lanolin. The soap and fatty acids are separated, and the unsaponifiable portion containing the sterols and the alcohols is bleached to give the lanolin of commerce, and the super pharmaceutical grade. The uses of lanolin are increasing every year, for in addition to being used as a base for ointments and salves, the pharmaceutical grades are used in the manufacture of cosmetics and medical plasters. The commercial lanolin varies considerably in color and free fatty acid content, the latter being as high as two to three per cent. Large quantities of commercial lanolin are used in the manufacture of anti-rust paints and solutions, and leather-dressing compounds. It is also used for super-fatting toilet soaps, processing rubber, for blending with oils and greases to increase their viscosity and as a foam breaker in the sugar-beet industry. Lanolin is extremely hygroscopic, and this characteristic enables the manufacturer of hydrous lanolin to incorporate up to 60 per cent. of water with the commercial anhydrous grades, giving the white creamy lanolin usually sold in tubes.

The dark brown fatty acids which are separated from the crude brown grease in the manufacture of lanolin have many uses. From the major portion, oleines and stearines are obtained by distillation, while a considerable amount is used in rope batching and for the lubrication of jute, hemp, and sisal fibres. It is also used in the manufacture of cheap axle box greases and low-grade lubricants.

### Neutral Greases in the U. S. A.

The neutral greases obtained from the centrifugal processes are applied in various ways in addition to those already mentioned. The centrifuged grease usually contains from 1.5 to 4 per cent. of free fatty acid as against the 15 to 20 per cent. free fatty acid content of the brown grease from the acid cracking processes. The color is also very much paler than the brown grease, so much so that it quickly reacts to bleaching agents to give a good grade lanolin. It is used to a large extent in America for the manufacture of lithographic, multigraphic, and typewriting inks, carbon papers, calico printing inks and ordinary printing inks. It is also used as a special neutral lubricant for valves, taps, wire drawing and steel cutting, as a waterproofing material, in shoe polishes, and in varnishes for coloring and water-proofing electric bulbs. The centrifuged greases are largely employed in the distillation of the higher wool fat alcohols, as they contain a much higher percentage of these bodies.

The grease obtained from the Barber Jet process is of a thick, smooth consistency. Most of this grease, particularly in France, is used for the non-destructive distillation of the higher wool fat alcohols which constitute the alcohol components of neutral wool fat and are known as wool waxes. In this method of distillation the fatty acids are left behind in the pitch. Six distinct distillates are obtained. These waxes are not oxidizable and will not go rancid, nor do they become resinous. Wool wax is a very suitable ingredient as a dispersant in the oil-blending trade.

Oxy-cholesterine finds a large market in the cosmetic industry as an absorption base. A mixture containing five parts of this wax to 95 parts petroleum jelly will absorb up to 230 parts of water. If mixed with lanolin it will absorb ten times its weight of water to give a fine almost snow-white cream, which is suitable for cold creams, and has the soothing and emollient properties of the latter. Another product of this distillation is a fatty alcohol which can be sulfonated very easily.

In the past it has been argued that owing to the limited market, wool grease produced by ordinary methods and that from special processes differed so little in selling prices that the expenditure necessary to modify plant was unjustified. This is chiefly the reason for the lack of progress in extracting processes. Happily, the position is being rapidly reversed, partly due to the new markets that have been created during the past few years and partly through the artificial boom caused by the re-arming of Europe. At the present time it is doubtful if there is a comber in Bradford who holds any stock of wool grease. The sud-cake produced in the acid process by hot pressing is the only by-product for which there is no market today.—*Chemical Trade Journal,* Mar. 5, '37, p205.

# Organic Accelerators

## *By E. A. Van Valkenburgh*

FROM the standpoint of the organic chemist it is interesting to trace in some detail the progressive development from the first relatively simple chemicals used to the mixtures of complex substances employed for acceleration purposes today. While Oenslager's discovery of aniline as the first organic accelerator was an epoch-making achievement, it is not surprising that because of its low accelerating power this material was replaced in a few years by other more active amines. For example, paraphenylenediamine was soon found to be a much stronger accelerator than aniline, and paraaminodimethylaniline, as satisfactory as any of the free bases, was rather generally used for some time.

About 1910 nitroso compounds also were found to accelerate rubber vulcanization. The early study of amino derivatives led to the limited commercial use of paranitrosodimethylaniline. Later in Europe nitrosobenzene and nitrosophenol also were adopted to some extent. In general, however, trouble with toxicity and discoloration, as well as the increasing need of more powerful accelerators, gradually led to the substitution of aldehydeamines and carbon disulphide derivatives for these nitroso bodies and for the free amines.

During this transition period the substituted aryl guanidines were widely adopted. In fact they were perhaps the most extensively used organic accelerators from 1920 to 1930, until mercaptobenzothiazole and various combinations of the sulfur bearing ultra-accelerators came into prominence. Triphenylguanidine, because it gave less premature curing trouble during processing, became more popular for many applications than the diphenyl or diorthotolyl bodies. Nevertheless these two substances had become well established for small molded articles and are still employed extensively in such work today. As primary accelerators for general purposes, though, guanidines are being rapidly curtailed. They give considerable premature vulcanization trouble, discolor rather badly, cause low resistance to cracking, and are devoid of antioxidant properties. In spite of these objectionable features the guanidines are very effective as supplementary activating materials in accelerator mixtures. Used in low percentage they do not detract appreciably from the superior aging and other desirable characteristics obtained from the primary accelerators, and they usually contribute specific valuable properities in addition to positive acceleration of the rate of cure.

The aldehydeamines are an important group of accelerators which first came into prominence nearly thirty years ago when hexamethylenetetramine was developed as a substitute for aniline. This substance commonly called "hexa," gave little scorch trouble, did not discolor, and was suitable both for mold and air curing. The fact that it often caused dermatitis, however, together with its mild activity, led to its gradual replacement during recent years, by more active aldehydeamines, frequently in combination with sulfur bearing substances.

Aldehydeammonia, the other original member of this group, was soon supplanted by acetaldehydeaniline, several modifications of which have been featured commercially. Depending upon the ratio of aldehyde and amine employed and upon the manner in which they are combined, there are many different possibilities in this class of condensation products. Generally speaking, formaldehyde functions well when combined with aliphatic amines, but poorly with aromatic amines. Acetaldehyde, butyraldehyde, and heptaldehyde, on the other hand, yield excellent accelerators when condensed either with aromatic or aliphathic bases.

By 1925, after fifteen years of development work, the more powerful aldehydeamines had become a big factor in replacing the guanidines as primary accelerators. They usually facilitate the processing of raw rubber compounds, but their resistance to scorching varies from one member of the class to another. Being most effective at higher vulcanizing temperatures, they are more suitable for molded articles than for air cured goods. The more active members of this group, however, particularly the butyraldehyde and heptaldehyde condensation products are used in air cured goods in conjunction with carbon disulphide derivatives, the combination frequently being activated by a guanidine.

The latest notable commercial addition to this group is phenylaminomethylbenzothiazylsulphide, the reaction product of mercaptobenzothiazole with formaldehyde and aniline. As a result of much intensive experimental compounding in recent years, the sulfur-bearing substances, often listed as carbon disulphide derivatives, have become the most important category of organic accelerators. With regard to chronological development, important members of this group were thiocarbanilid, first adopted commercially at Akron in 1907 as a less toxic, more powerful substitute for aniline; "Pip-pip" disclosed by a German patent in 1913, as mentioned previously; and mercaptobenzothiazole, announced in 1921 and generally accepted by the industry during the past fifteen years.

The complex sulfur compounds in this category logically fall into two classes: first, the thiocarbamate, thiuram sulfide, and xanthate types, which have essentially straight chain linkages between the aliphatic or aromatic substituent radicals; and second, the benzothiazoles, for which the typical five atom ring always constitutes the intermediate linkage. In general the so-called ultra and semi-ultra modern accelerators are furnished by this first class, while the benzothiazoles from the second are continually becoming more popular for all sorts of general compounding problems.

Several members of the first class are now being featured commercially as low critical temperature, high modulus accelerators. On account of their extreme activity, however, they usually are used as secondary or boosting agents in conjunction with mercaptobenzothiazole or other milder primary accelerators. Abstracted from *India Rubber World,* Jan. 1, '37, p51.

# Adhesive Removers

## By Dr. Charles F. Mason

ALTHOUGH paint and varnish removers have been on the market in readily usable form for many years so far no one has attempted to make and sell a remover for all types of adhesives, which are synonymous with cements, binding and filling materials. The reason is that paints, varnishes and lacquers, even with the recent introduction of synthetic resins, are soluble or partially so in a mixture of organic solvents or some ingredient is hydrolyzed by an alkali; the result being a ruptured film, which can be removed by mechanical action.

The same is true for a class of adhesives, which contain resins and oils; but such is not the case for many cements which contain such a widely varying class of materials in so many different combinations for specific purposes and are applied in such varying degrees of thickness that a mixture for general use is hardly possible. Many cases arise where surfaces are to be rejoined and the usual custom is to use mechanical action with damage to the surface and loss of time and energy.

For the sake of simplicity the adhesives are divided into seventeen groups under each of which the solvents mentioned will usually suffice.

**Resinous Cements:** Benzine, benzol, kerosene, carbon tetrachloride, trichlorethylene, turpentine, hexalin, methyl alcohol, carbon disulfide.

An aqueous solution of sodium hydroxide in which any of the above solvents are emulsified or mixed by shaking will often suffice for natural resins, but for synthetic ones the process is one of experimenting unless the resin and its solvents are known. Mixing the solvent or solvents with an inert powder and applying in the form of a paste will aid in avoiding loss of solvent by evaporation.

**Thermoplastic Cements:** Simple warming is sufficient, but in case the surface may be damaged the following solvents are useful especially for sulfur cements: carbon disulfide, dichlorethylene, benzol, tetralin (warm).

**Linoxyn Cements:** (Those embodying linseed oil and resins). The average commercial paint or varnish remover, but if these are not available mixtures of the following solvents will suffice: amyl alcohol, tetralin, hexalin.

**Gutta Percha:** Carbon disulfide, trichlorethylene, chloroform, dichlorethylene, benzol (warm), benzine, turpentine.

**Rubber Cements:** Mixtures of benzol, chloroform, dichlorethylene, tetralin, alcoholic carbon disulfide.

**Glue and Gelatine:** Hot water, dilute acetic acid, warm vinegar.

**Corrosive Cements:** Ten per cent. solutions of any mineral acids like hydrochloric, sulfuric or nitric.

**Celluloid:** Mixtures of amyl acetate, ethyl acetate, amyl formate, hexalin, methyl alcohol, butyl acetate, acetone, methyl ethyl ketone.

**Magnesium Oxychloride Cements:** Ten per cent. solutions of inorganic acids like hydrochloric, sulfuric or nitric.

**Zinc Oxychloride Cements:** Acids (same as under magnesium) or warm sodium hydroxide of the same concentration.

**Litharge Glycerine Cements:** Ten per cent. solutions of sodium hydroxide or nitric acid.

**Sealing Waxes:** Any of the solvents listed under resinous cements. Ten per cent. solutions of sodium hydroxide used warm.

**Casein Cements:** Ten per cent. solutions of any of the following alkalies: borax, sodium carbonate, ammonium chloride, sodium hydroxide.

**Gypsum Cements:** Hydrochloric acid, ten per cent.

**Sodium Silicate Cements:** Warm sodium hydroxide in 15 per cent. solution. Sodium fluoride used with water out of contact with acids and exercising care to avoid inhalation of fumes.

**Lime Cements:** Ten per cent. solutions of hydrochloric, nitric, or acetic acids.

**Bakelite:** Solvents listed under resinous cements in case the Bakelite has not been previously heated beyond the conversion point. If such is the case it must be removed mechanically because it has become resistant to all solvents up to 300° C.

After consideration of this list of materials one might conclude that the problem is simply one of experiment because only a chemist could even guess the class of cement under consideration, and with no previous knowledge of it a chemical analysis might have to be attempted. Then after determining the type, trials would have to be made with the different solvents listed.

But it is much simpler than that because by taking into consideration the types of bodies joined the average layman will be able to detect sealing wax, glue, Celluloid and rubber cements. Thermoplastic and gutta percha cements soften upon heating and harden again upon cooling. Magnesium oxychloride, zinc oxychloride, and sodium silicate cements are used largely on floors, walls, and ceramic-ware like statues, sinks, and glazed earthen-ware in general.

So there remain resinous cements, linoxyn cements, corrosive, litharge, glycerine, casein and Bakelite. Their detection and removal are often difficult for reasons discussed above and patience must be exercised in trying any of the solvents. No proportions of the solvents in different mixtures are recommended, but to avoid purchase of all when two might be sufficient, it is suggested that at least three mixed in equal amounts be tried upon the assumption that if one-third of the mixture is inert for one resin the other two-thirds might be solvents.

As stated above no products have been offered for sale as general adhesive removers but three which the writer has found quite useful in meeting the needs of building superintendents are listed below. They must be packed in glass containers and with specific instructions that strongly corrosive alkalies or acids are present to avoid careless use and resultant damage to expensive objects.

1

| | |
|---|---|
| Water | 20 |
| Sodium hydroxide | 20 |
| Benzine | 15 |
| Tetralin | 20 |
| Alcohol | 25 |

2

| | |
|---|---|
| Water | 30 |
| Hydrochloric acid | 10 |
| Amyl acetate | 20 |
| Tetralin | 30 |
| Alcohol | 10 |

3

| | |
|---|---|
| Water | 30 |
| Borax | 8 |
| Hexalin | 20 |
| Turpentine | 22 |
| Benzine | 20 |

It cannot be emphasized too strongly, that producers of chemical specialties can develop a large field for this class of goods, which are needed in industries and homes. Chemical solution of previously processed chemicals which have served their purpose is more efficient than their removal by mechanical action.

# Chemical Specialty Patents

Manufacture gypsum lumber. No. 20,275. Reissue. Clarke F. Davis, Short Hills, N. J., to American Cyanamid & Chemical Corp., New York City.

Preparation fireproofing composition comprising a water soluble salt of an aliphatic organic nitrogen base with an acid of phosphorus. No. 2,071,353. Willard L. Morgan, Nutley, N. J., to Sylvania Industrial Corp., Fredericksburg, Va.

Preparation fireproofing composition comprising a water soluble salt of a sulfonated aryl derivative of an acid of phosphorus. No. 2,071,354. Willard L. Morgan, Nutley, N. J., to Sylvania Industrial Corp., Fredericksburg, Va.

Manufacture container type wax applicator having a wax reservoir in the form of a compressible structure of cellulose sponge material and a charge of wax therein. No. 2,071,365. John Stroop to Pad-Y-Wax Co., Inc., both of New York City.

Production adhesive for manufacture of transparent laminated safety glass using cellulose acetate plastic in process. No. 2,071,377. Wm. J. Arner and Roy W. Wampler to Libbey-Owens-Ford Glass Co., all of Toledo, O.

Manufacture acid and water-proofed fabrics; using coating of an oxidized oil and a non-drying oil. No. 2,071,436. Geo. Schneider, Montclair, N. J., to Celanese Corp. of America, corporation of Del.

Manufacture densely sintered ceramic insulating materials with low dielectric loss. No. 2,071,452. Walter Bloch, Kidsgrove, Stoke-on-Trent, England.

Production anti-freeze compound, comprising glycerine, alcohol, water, urea, flaxseed, tertiary butyl phenol, sodium carbonate, and a dye. No. 2,071,482. Carl Winning, Elizabeth, and John B. Holtzclaw, Roselle, N. J., to Standard Oil Development Co., corporation of Del.

Insecticidal composition composed of a diaryl substituted guanidine, pyrethrum extract, and a fatty acid, in solution in a non-aqueous solvent. No. 2,071,484. Geo. C. Wittwer, Chappaqua and Mahlon H. Beakes, Larchmont, N. Y., to American Cyanamid Co., New York City.

Anti-freeze lubricating grease; using a sett grease, a wetting agent, and an anti-freeze salt. No. 2,071,488. John C. Zimmer, Elizabeth, N. J., and Arnold J. Morway, Jackson Heights, N. Y., to Standard Oil Development Co., corporation of Del.

Preparation washing and cleansing compound, free of fatty acid soaps, comprising water-soluble mineral-oil acid sludge sulfonates and an alkali salt of an alcohol sulfate detergent. No. 2,071,512. Carleton Ellis, Montclair, N. J., to Standard Oil Development Co., corporation of Del.

Production lacquers and lacquer starting materials of filling lacquers free from material forming hard non-suspensible deposits and containing artificial resin. No. 2,071,524. Richard Hessen, Bautzen, Germany.

Manufacture abrasive coated articles; using a solid permanently-fusible resin capable of becoming infusible by heating with a hardening agent. No. 2,071,549. Osborne L. Mahlman, Kenmore, N. Y., to Carborundum Co., Niagara Falls, N. Y.

Production a completely insulating air- and acid-proof protective coating especially for mirrors, using asphalt, spirits of turpentine, copal resin, red lead, and egg albumen. No. 2,071,555. Heinrich Meder, Dresden, Germany.

Production non-corrosive lined container. No. 2,071,602. Richard S. Rheem, Oakland, Cal., to Rheem Mfg. Co., Richmond, Calif.

Production roofing material having a cementitious coating, comprising a hydraulic cement and a soluble fluoride No. 2,071,681. Lorrin T. Brownmiller, Scarsdale, N. Y., to Bakelite Building Products Co., Inc., New York City.

Apparatus for spraying material. No. 2,071,846. Chas. P. Lamb and Isaac E. Schine to Cilco Terminal Co., Inc., all of Bridgeport, Conn.

Cathode adapted to emit electrons freely when heated; comprising a deeply pleated sheet member of a nickel-cobalt alloy containing ferro-titanium. No. 2,071,849. Erwin F. Lowry, Wilkinsburg, Pa., to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Manufacture musical beating reeds; coating cane reed with solution of cellulose plastic material. No. 2,072,054. Albert Melvin Larsen to Permanent Reed Co., both of Seattle, Wash.

Waterproof match card; paper matches impregnated and thinly coated with waterproofing compound consisting of a water insoluble aluminum soap, hydrogenated fish oil, and rubber. No. 2,072,097. Thos. L. Cunningham, New York City, to Drigard Products Corp., corporation of Del.

Abrasive grain for use in manufacture organic bonded abrasive articles; consisting of a loose mass of abrasive grains, each encapsuled in a film comprising a heat-hardened mixture of crude rubber and a synthetic resin. No. 2,072,146. Chas. E. Wooddell, Frederick A. Upper and Chas. S. Nelson to Carborundum Co., all of Niagara Falls, N. Y.

Pest-combating agent comprising peat having hydrocyanic acid absorbed therein. No. 2,072,226. Paul Stricker, Monthey, Switzerland, to Society of Chemical Industry in Basle, Basel, Switzerland.

Method of dry cleaning. No. 2,072,332. Arthur Edward Hatfield, Toronto, Ont., Canada.

Cement grout mixing and distributing machine. No. 2,072,301. Geo. Wentworth Grayson, Darling Point, near Sydney, Australia, to John Thomas McKee, Sydney, Australia.

Neutralizing and insulating refrigerant; comprising mixture of a soluble refrigerant salt with finely divided absorbent carbon. No. 2,072,367. Joseph M. Hill, Cleveland, O., two-thirds to Henry S. Narten and Robert Van Stone.

Manufacture wetting, penetrating, frothing, and washing agents; treating higher monohydric aliphatic alcohols with sulfuric acid in which at least one hydrogen atom is substituted by an organic radicle, and subsequently with condensing agents. No. 2,072,475. Rudolph Kern, Oschatz, Germany, to Chemische Fabrik R. Baumheier Aktiengesellschaft, Zscholau, Germany.

Manufacture bonded abrasive article; comprising abrasive grains and bond produced from a dispersion of vulcanizable previously coagulated rubber in liquid comprising a normally liquid resin. No. 2,072,507. Osborne L. Mahlman, Kenmore, and Raymond C. Benner, Niagara Falls, N. Y., to Carborundum Co., Niagara Falls, N. Y.

Flame resisting conductor; including a fibrous jacket treated with a flame resistant saturant and a coating of blown asphalt. No. 2,072,557. Anthony P. Hinsky to Pyro Products Corp., both of Brooklyn, N. Y.

Method bleaching sugar, using lime, a soluble phosphate, and hydrogen peroxide in process. No. 2,072,639. Hans O. Kauffmann to Buffalo Electro-Chemical Co., Inc., both of Buffalo, N. Y.

Bleaching animal fibers by treatment with a reducing agent capable of evolving sulfur dioxide, then subjecting fiber to action of an acid solvent, finally subjecting fiber to action of a dilute alkaline bleaching solution of hydrogen peroxide. No. 2,072,665. Donald J. Campbell and LeRoy P. London, Niagara Falls, N. Y., to du Pont, Wilmington, Del.

Drier for paints and varnishes in form of a polyvalent water-insoluble, metal salt of a phthalamic acid. No. 2,072,770. Ebenezer E. Reid, Balto., Md., to du Pont, Wilmington, Del.

Manufacture an oil-soluble castor oil soap. No. 2,072,824. Oney P. Puryear, Beacon, N. Y., to Texas Co., New York City.

Process washing fruit for removal of spray residue, using chemical solution. No. 2,072,865. Chas. M. Bryant, Seattle, Wash.

Spray coating machine. No. 2,072,948. Frank A. Geffs to De Vilbiss Co., both of Toledo, O.

Manufacture paving blocks, using bitumen-impregnated felt in process. No. 2,072,958. Stuart Parmelee Miller, Tenafly, N. J., to Barrett Co., New York City.

Manufacture fireproof material; organic fibrous material impregnated with mixture of a wax-like chlorine containing uninflammable substance, and a chlorine containing uninflammable lacquer-forming compound. No. 2,073,004. Rudolf Engelhardt, Leverkusen-I. G.-Werk, Germany, to I. G., Frankfort-am-Main, Germany.

Preparation germicidal composition; containing free iodine peptized by ferric iodide. No. 2,073,021. Raymond C. McQuiston, West Newton, Mass., 25% to Errold B. Thomas, Newton, Mass., and 25% to Calvin B. Smith, Boston, Mass.

Production pure soaps from oxidized non-aromatic hydrocarbons of high molecular weight. No. 2,073,054. Hans Franzen, Mannheim, Germany, to I. G., Frankfort-am-Main, Germany.

Preparation clearly water-soluble bactericidal solutions comprising a largely de-proteinized sulfonated oil, a phenolic compound, and a polyhydric alcohol. No. 2,073,057. Paul Goedrich, Elizabeth, N. J.

Preparation high grade asphalts; blending asphaltic bituminous material with an easy flowing low viscosity index hydrocarbon oil, treating with an oxidizing gas, and blending with a highly viscous low viscosity index hydrocarbon oil. No. 2,073,088. Alvin Pierce Anderson and Wm. Kenneth Nelson, Wood River, Ill., to Shell Development Co., San Francisco, Cal.

Manufacture heat insulating material; composed of raw sized cyanite, clay, and a chemical and dilute acid solution. No. 2,073,138. Geo. A. Bole, Columbus, O., to Laclede Christy Clay Products Co., St. Louis, Mo.

Method and apparatus for producing fire-extinguishing foam. No. 2,073,204. Wilhelm Friedrich, Berlin-Charlottenburg, Germany.

Manufacture printing ink, using pigment, drying oil and resin in process. No. 2,073,229. Ralph C. Shuey, Mountain Lakes, N. J., to Bakelite Corp., New York City.

Inside-frosted incandescent electric light bulb; applying a supersaturated solution of sodium phthlate to inner surface of the bulb. No. 2,073,237. Rinjiro Yajima, Shinagawa-ku, to Todendenkyu Kabushiki Kaisha, both of Tokyo, Japan.

Liquid insulator and dielectric for use in electrical devices; comprising phenyl-di-ortho-diphenyl phosphate. No. 2,073,245. Albert E. Maibauer, Bloomfield, N. J., to Halowax Corp., New York City.

Composition for cleaning and polishing tin-plate, composed of wheat and rye middlings, and diatomaceous earth. No. 2,073,427. Eugene X. Riley, Sparrows Point, Md.

Preparation moisture-proof coating composed of wax and a condensation derivative of rubber obtainable by treating rubber with the halide of an amphoteric metal or chlorostannic acid; between coating and the regenerated cellulose, a water-resistant bonding layer, composed of a drying oil. No. 2,073,301. Samuel D. Gehman, Akron, O., to Wingfoot Corp., Wilmington, Del.

Preparation detergent, wetting, and penetrating composition; containing pure alpha-terpineol, sodium oleate, and water. No. 2,073,464. Wheeler P. Davey, State College, Pa., to Hercules Powder Co., Wilmington, Del.

*Patents include those appearing in the "U. S. Patent Gazettes," Feb. 23 to March 16.*

# Metaphosphates In Hard Water

The behaviour of metaphosphates, in absence of soap, with the substances in water which cause hardness, has been determined by K. Lindner (*Melliand Textilber*, 1936, 17, 861 and 935, through *J. Soc. Dyers and Col.*, Feb. 1937) from a series of turbidity measurements with waters of increasing hardness. Additions up to about one-third of the quantity of metaphosphate theoretically necessary to remove the hardness completely, cause turbidity or flocculation which disappears again on adding a further quantity of metaphosphate. It is suggested that insoluble calcium-calcium metaphosphate is first formed, and is then converted into the soluble sodium-calcium metaphosphate.

On warming, particularly to the boiling point, turbidity is re-developed owing to conversion of the meta- into the ortho-phosphate. This sensitivity of the metaphosphate to heat is not increased considerably by keeping the solution. Organic lime soap dispersing agents do not exhibit this phenomenon. Photometric examination of solutions of soaps in hard water, in presence of increasing quantities of metaphosphate and organic dispersing agents, indicates that metaphosphate produces, at first, a slow and then a rapid decrease in turbidity, whereas organic protective colloids produce a more gradual decrease.

The activity of metaphosphate decreases on keeping the solution for a prolonged period or on heating. Experiments with freshly-precipitated and dry calcium stearate show that metaphosphate does not disperse the lime soap, but combines chemically with it. In soap-free liquors containing alkali and metaphosphate, the latter does not exert a detergent action, whereas organic protective colloids manifest their detergent properties fully in presence of alkalis and in hard water.

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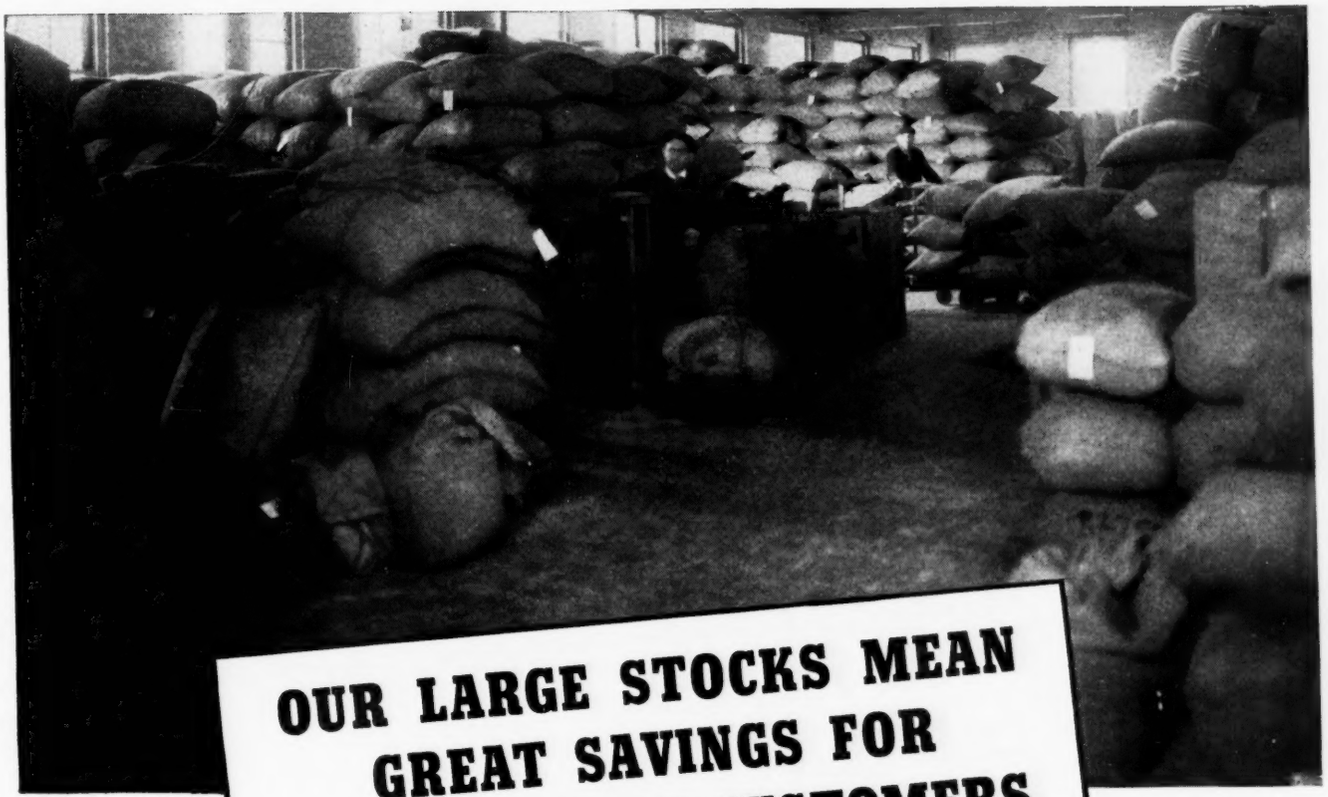

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# SPECIALTIES GAIN 4% IN '35

**Wage Earners Up 4%; Wages Advanced 11%—California to Revise Structural Pest Control Law—Three-In-One Wins Trade-mark Decision—**

U. S. manufacturers of cleaning and polishing preparations reported slight increases in employment and production in 1935 as compared with 1933, according to preliminary figures compiled from returns of the Biennial Census of Manufactures. The wage earners employed in the industry in 1935 numbered 2,757, an increase of 4% over 2,655 reported for 1933, and their wages, $3,033,449, exceeded the 1933 figure, $2,721,985, by 11%. The total value (at f. o. b. factory prices) of the products made in this industry in 1935 amounted to $42,658,397, an increase of 4% as compared with $41,048,318 reported for 1933. This industry, as constituted for Manufactures Census purposes, embraces establishments engaged primarily in the manufacture of cleansers, washing powders, and washing compounds containing no soap; dry-cleaning preparations; metal, automobile, and other polishes; and paint and varnish removers. (Cleansers, washing powders, and washing compounds containing soap are made to a large extent by establishments classified in the soap industry.

**California Pest Control**

California is in the middle of a heavy program on Legislation having as its purpose that of amending certain parts of the present Structural Pest Control Law. Incidentally California is the only state having statewide legislation for the pest control industry, and generally speaking, the industry heartily approves the results so far obtained in that state. M. G. Jorgenson, chairman of the Board, has taken up headquarters at Room 311, Sacramento Hotel, Sacramento, Calif., that he might appear before necessary committees to aid the industry in having the license fee increased to $25.00 that a permanent inspector might be had in the field to assist with enforcement of the law. Other proposals include better definitions as to "household," "operator," "establishment" and "branch establishment." Especially is it being requested that any person in charge of a branch office should be a duly qualified person who will have met the requirements of a licensed operator.

**Advertising, Promotion Plans**

S.-W. has ended its Metropolitan Opera radio series and has started a Thursday afternoon program through T. J. Maloney, Inc.

Stanco is going in for small but frequent space for this summer's campaign for "Flit" insecticides. No "special offer" will be made this year, according to A. J. Millard, advertising manager.

National Lead started a radio test for its paint products on March 15th, in a series of quarter-hour transcribed programs in 6 markets.

P. & G. required a two-page spread in Liberty last month to list the 1,006 winners in its current $1,000-a-year-for-life contest for Camay Soap.

**Important Trade-mark Decision**

Three-in-One Oil has been sustained by the Court of Customs and Patent Appeals in a fight against the registration of the trademark, "Three-in-One Cement," by the St. Louis Rubber Cement Co. Decision reversed a Patent Office Ruling. One judge entered a dissenting opinion, declaring that the ruling will give a false construction to the trademark rules as they stand.

**With New Addresses**

Specialty companies in new locations include:—Corn Oil Soap now at 2301 E. 53rd st., Los Angeles; Sterling Laboratories to 132 So. Pennsylvania st., Indianapolis; and the N. Y. City branch office of Dethol Manufacturing to 160 E. 56th st.

**Proper Stoneware Cleaners**

Cleansing agents for stoneware are discussed in a report of the British Building Research Board obtainable from His Majesty's Stationary Office, London, at 3s. 6d. The indiscriminate use of alkali cleaners is condemned as being as bad as the use of acid cleaners. Alkali powders are generally safe on dense stones like marble, provided the powder does not come in direct contact and a thorough rinsing is given.

**New In the Field**

New companies in the household specialty field include:—Spanish Queen Soap, Los Angeles; Stone & Weaver, Leaksville, N. C., to make a specialty cleaner; New Chemicals Co., Detroit, to make floor wax and a glass cleaner.

**Drastic State Trade-mark Bill**

Washington Senate Bill 217 provides for the registration of trademarks in the state, and if not renewed every 5 years would permit any other person to register such trademarks. Nebraska Legislative Bill 207 would require the appointment of an agent within the state.

**Beaumont Chemical Reorganizes**

Beaumont Chemical, manufacturer of D-S Insect Spray, has been reorganized with E. L. Lee of Houston, Tex., as president.

**Dold Visits Florida**

C. Norman Dold, former president of the National Association of Fumigators & Exterminators, was in Florida last month.

**Heider Buys Columbus Soap**

Heider Chemical, 114 N. 3rd st., Columbus, Ohio, is enlarging the scope of its operations and has purchased Columbus Soap. Three new men have been added to the sales staff.

# New Specialties Shown at Textile Exposition

**Potash Soap Makers Organize—Soap Industry Meets in Chicago—Houghton Announces New Series of Metal Cleaners—News of the Industrial Chemical Specialty Field—**

Manufacturers of textile chemical specialties were jubilant over the results obtained at the 12th Southern Textile Exposition, held at Greenville, S. C., on April 5-10th. Recovery in textiles has been pronounced in the past 6 months or so and all indications point to a continuance of favorable conditions for several months to come barring possible labor troubles.

Among those exhibiting were:—American Cyanamid & Chemical; Arnold Hoffman & Co.; Hercules; E. F. Houghton & Co.; Mathieson Alkali; Stein, Hall; Jacques Wolf & Co.; and A. E. Staley Manufacturing.

**Soft Soap Group Formed**

Potash soap makers have organized a Potash Soap Division of the Association of American Soap and Glycerine Producers. A sub-committee on waxes and wax products was also formed. C. Solly, Harley Soap, Philadelphia, is chairman of the Division. J. E. Stevens, Association of American Soap and Glycerine Producers, is secretary.

A general meeting of the soap industry was held in Chicago on April 8th, under the auspices of the association. A number of general topics and problems affecting the industry as a whole were discussed.

**Federal Trade Commission Notes**

The Federal Trade Commission has issued a complaint against Banner Manufacturing, 841 E. 43rd st., Brooklyn, charging misleading representations of Banner Radiator Glycerine.

Clorox Chemical has agreed to discontinue representing that its product kills several infectious germs in less than 10 seconds and also that it will remove stains and destroy odors, unless such representations are properly qualified.

**New Chemical Specialties**

The E. F. Houghton & Co., Philadelphia, announces an entirely new series of

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# INDUSTRIAL CHEMICALS

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A comprehensive line of Coal-Tar Derivatives serving the following Industries:
TEXTILE · SYNTHETIC RESIN · PAINT · LACQUER · MINING · WOOD PRESERVATION · INSECTICIDE · GERMICIDE · RUBBER · GASOLINE AND OIL · STEEL · EXPLOSIVE · PHARMACEUTICAL

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ISO DICHLORO SUCCINIC ACID
ISO DICHLORO SUCCINIC ANHYDRIDE
MONO CHLORO MALEIC ANHYDRIDE
PHTHALIMIDE
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POTASSIUM PHTHALIMIDE
POTASSIUM SUCCINIMIDE
SUCCINCHLORIMIDE
SUCCINIMIDE
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# INTERMEDIATES

metal cleaners to be known as the "Houghto-Clean, 100 Series." They replace the earlier series of the same name and cover a wider range of operations. The 100 Series is made up of 9 compounds covering light, medium and heavy duty cleaning.

"Nofog," a chemical compound to be used by pilots to make soundings when above a fog is being made by Aircraft Safety Devices, Berkeley, Calif.

Glyco Products, 148 Lafayette st., N. Y. City, is offering Lemenone A, a lemon oil substitute.

The Davies-Young Soap Co., Dayton, Ohio, has announced "Nu-Way" filter soap for petroleum solvent high pressure filtration systems.

**An Explosive Boiler Compound**

Two men were held in Bridgeport, Conn., last month for selling a boiler compound which it is alleged they sold as harmless but which was explosive and caused an explosion and the death of a workman in the plant of the Danbury Rough Hat Co. Those involved are Maurice A. Hogan and Percy G. Hudson, both of New Haven.

**New Booklets**

Keiner & Co., 400 Adams st., Newark, N. J., has published an attractively bound series of notes on the qualifications of its numerous products for the tanning and finishing of leather.

Mathieson Alkali, 60 E. 42nd st., N. Y. City, has just published "Making Rug and Carpet Cleaning Pay," by V. M. Kalusdian, rug cleaning authority.

C. K. Kirkpatrick Specialty Co., 7302 Melrose ave., Los Angeles, has issued a booklet on "Facts on Leather Cleaning and Finishing."

**Names In the Specialty Field**

D. C. Ball, president of Oakite Products and also the Oakley Chemical Co., has just purchased a winter home near Pasadena, Calif.

Percy C. Magnus, president, Magnus, Mabee & Reynard, N. Y. City, essential oil house, is chairman of the drugs and pharmaceuticals committee of the '37 Salvation Army Drive. Edward A. Olds, Jr., president of Packer's Tar Soap, Inc., is vice-chairman.

Rufus W. Clark, Eaton-Clark board chairman, has returned from an extended South American trip. He contacted users and jobbers of chemical specialties in several countries.

**In New Positions**

Ken R. Dyke, former Colgate-Palmolive-Peet advertising manager and well known in the chemical specialty field, has become eastern division sales manager for NBC.

John W. Purcell, formerly with Bowker Chemical and previous to that with the insecticide division of S.-W., is now eastern sales manager for McLaughlin, Gormley, King & Co., Minneapolis, well-known producer of pyrethrum products.

George M. Cunningham of National Oil Products' technical sales division has been transferred to the San Francisco office.

Leon P. Brick, for the past 12 years special field representative for Onyx Oil & Chemical, Jersey City, N. J., has been made assistant general sales manager.

William E. Philbrick, president, Beach Soap, is now chairman of the Board. Edward S. Bassett is the new president.

**Deaths of the Month**

Samuel W. Wheelock, 66, a salesman for Borne Scrymser, oil manufacturer, died on March 6th, following a sudden heart attack.

Harold A. Bates, 59, soap sales manager for the old Colgate Co., died on March 9th. He was with the company for 30 years and retired in '29.

**Industrial Chemical Specialty Companies**

Hi-Power Chemical's plant, Easton Furnace, Pa., manufacturer of laundry chemical specialties, was swept by fire on March 3rd.

The Monite Co., assured moth-proofing, is in new headquarters at the Roosevelt Bldg., 4901 Delmar Blvd., St. Louis.

The Arco Chemical Products Co., Alonzo Adkins, president, has started a plant on East Government st., Mobile, Ala.

The Southwestern Chemical Co., Jonesboro, Ark., has been incorporated with a $10,000 capitalization.

Banner Folding Box, N. Y. City, is seeking to recover a $3,000 judgment against the Kilsoot Chemical Co., Alfred, Me., obtained in '32.

Marine & Stationary Chemical, 693 Park ave., Union City, is a new maker of metal detergents.

The New England Chemical & Supply Co. has taken quarters in the Everett Mill Properties, Lawrence, Mass.

All sales and service of Iding Polishing Cement in the New York and New England territory will henceforth be handled from the main office, according to a recent announcement of the M. P. Iding Disc Grinding Compound Co., Milwaukee.

Industrial Lubricants, 5736 12th st., Detroit, Mich., has just appointed Lea Mfg. Co., Waterbury, Conn., as representative for their "Grainlock" polishing wheel cement in the Eastern territory.

**Boiler Water Conditioning**

The 4 essentials of proper boiler water conditioning are:—Correct analysis of the problem, proper mechanical equipment, suitable chemical water treatment, and laboratory tests, according to Reginald Trautschold, writing in The Textile Power Plant Section of the *Rayon and Melliand Textile Monthly* for February. He gives a detailed discussion on boiler water treatment.

**Magnesium Oxychloride Cements**

The use of 10% of copper powder in magnesium oxychloride cements is suggested by Dean S. Hubbell, Mellon Institute, in the February issue of *Industrial & Engineering Chemistry*. The idea is the subject of patent applications in the U. S. and other countries.

**To Discuss Roof Coatings**

The National Paint, Varnish & Lacquer Association will hold the first annual meeting of the Roof Coating Division at the Mayflower in Washington on March 10th. One need not be a member of the association to attend.

**Sampling Soap Products**

The standard methods for sampling and analysis of commercial soaps and soap products, adopted in 1922, have been revised by a committee of the American Chemical Society. The report was printed in the Analytical Edition, *Industrial & Engineering Chemistry*, Jan. 15, '37.

**Oil Removers In Textiles**

A discussion of the fundamental conditions governing the use of the so-called "oil removers" in the grey mills (for removing oil stains from grey goods) is given on page 133 of the March 8th issue of *The American Dyestuff Reporter*.

**Labeling Toxic Paints**

N. Y. State Senate has passed a bill which would provide for the proper labeling of all paints and paint materials containing toxic substances.

**Extend Registration Period**

Trademark registration period in the Philippines has been extended to 60 days after official publication in place of the present 30-day period in deference to U. S. applicants.

**Active Soap Market**

Soap manufacturers are currently operating at or close to capacity. This is particularly true of the 3 largest producers.

**Heater for Soap**

Uneeda Cleaning & Dyeing Co.'s engineers (Newark, N. J.) have perfected a simple heater for soft soap when on cool days the soap does not mix properly with the cool solvent.

**New Profit Sharing Plan**

A new plan of sharing profits with employees has been adopted by Roxalin Flexible Lacquer, Elizabeth, N. J., manufacturers of lacquer and synthetic finishes. One of the features of this plan is the presentation of 5,000 shares of new Class "B" stock to 7 key men in recognition of their services to the company. These men are A. Miesem, treasurer and

ADVERTISEMENT—*This entire page is a paid advertisement.* *Prepared Monthly by the U. S. Industrial Chemical Co., Inc.*

# SOLVENT NEWS

APRIL ★ A Monthly Series of Articles for Chemists and Executives of the Solvent-Consuming Industries ★ 1937

## *DIBUTYL OXALATE IS NEW U.S.I. PRODUCT*

### *Companion to Diethyl Oxalate is Useful in Organic Synthesis And as Special Solvent*

Augmenting its ever growing list of ester solvents and chemicals comes U. S. I.'s latest development, dibutyl oxalate. Developed to supplement U. S. I.'s diethyl oxalate, the new chemical is an interesting addition to high boiling solvents and chemicals for synthesis.

Like the diethyl ester, dibutyl oxalate is expected to find varied uses. Diethyl oxalate first received rather unique application as a high boiling nitrocellulose solvent in fixing rare earth salts to cathode elements. The relatively higher boiling range (from 240 to 255 deg. C.) of dibutyl oxalate should suggest other specialized uses.

Both esters are readily adaptable to organic synthesis. Quantities of each are available in highly purified form. Dibutyl oxalate is supplied with ester contents of either 90, 95, or 99-100 per cent. Specifications of the 99 per cent grade are shown below:

**ACIDITY** (Free acid as oxalic) Not more than 0.05%
**COLOR** .....Water White
**DISTILLATION RANGE:**
Below 240° C.....Not more than 5%
Below 248° C.....Not less than 90%
Above 255° C. .....None
**DRYNESS**—Miscible without turbidity with 20 vol. 60° Be. gasoline at 20° C.
**NON-VOLATILE MATTER**— Not more than 0.005 g./100 cc.
**ODOR** .....Mild
**PURITY**—Ester content as Dibutyl Oxalate, Not less than 99%
**SPECIFIC GRAVITY** at 20/20° C., 0.989-0.993
**WEIGHT PER GALLON** at 20° C., 8.24 lbs. (approximate)
**BLUSH RESISTANCE** at 90° F. (10% R.S. ½ sec. Nitrocellulose Solution) Clear at 90% Relative humidity.
**COEFFICIENT OF EXPANSION:**
Per 1° F.....0.00053
Per 1° C.....0.00095
**DILUTION RATIO** (Nitrocellulose Method):
With Tuluol .....2.3
With Petroleum Naptha .....1.0
**FLASH POINT**.....265° F. (approximate)
**VISCOSITY** expressed in centipoises (10% ½ sec. nitrocellulose solution).....800
**WATER SOLUBILITY:** At 25° C. 100 cc. solvent dissolves 0.5 cc. water.

## TIRES WITH RAYON CORDS TRIUMPH IN ROAD TEST

Tires made of rayon cords, instead of the traditional cotton fabrics, were developed recently. Designed particularly for buses and trucks, the manufacturer claims they may be expected to give four to five times as much mileage as other tires on high-speed, heavy-load runs.

The rayon cords are said to retain their tensile strength under the most adverse conditions and resist heat and friction more than ordinary tire fabrics. Cotton growers and processors are reported to be watching this development with interest since rayon may replace cotton fabric in heavy-duty tires.

**A table** giving a comparison of screen, sub-screen and submicroscopic measurements together with equivalent linear measurements may be secured by writing to U.S.I.

# HANSA YELLOW MANUFACTURERS SHARE IN BETTER INK BUSINESS

### Trade Welcomes Addition of Acetoacet-ortho-toluidid To U.S.I. Line; Other Intermediates Also Available

As the printing ink industry closed its books for 1936, volume sales were reported to have increased more than 18 per cent higher than 1935 totals. Dollar sales were listed as 20 per cent greater for the same period. With advertising activity at the highest point since 1930 levels, there was potent evidence that ink manufacturers could once again look to larger markets—markets which, it might be observed, gave every indication of demanding more and more specialized products.

In the last analysis this specialization was very prominently reflected in calls for pigments having the qualities necessary for formulation of these specialty inks. As both process and offset camps waged their battle for buyer acceptance, there was greater stress placed on enhanced working properties and superior light- and alkali-fastness.

**Superiority of Hansa Yellows**

Among yellow pigments, the Hansa type yellows were the subject of closer scrutiny that centered in brilliant tone, superlative tinting strength and generally good-alkali fastness. Lithographic ink formulators gave added attention to utilizing such excellent working properties.

In addition, manufacturers of Hansa Yellows were able to point to even more recent improvements. Basically, these were an outgrowth of intensive development directed toward perfection of the intermediates necessary for manufacture. In past years, one of the most serious obstacles to this expansion was the lack of a ready domestic source of supply at prices within general reach.

When the U. S. Industrial Chemical Co., Inc., entered the field with production of acetoacetanilid, one of the most vital intermediates, real progress was made. In succeeding years U. S. I. chemists were able to

*(Continued on next page)*

## *FOUR S. D. FORMULAE ARE DISCONTINUED*

### *Revoke Nos. 11, 26, 31-B and 31-C; Not Expected to Affect Trade*

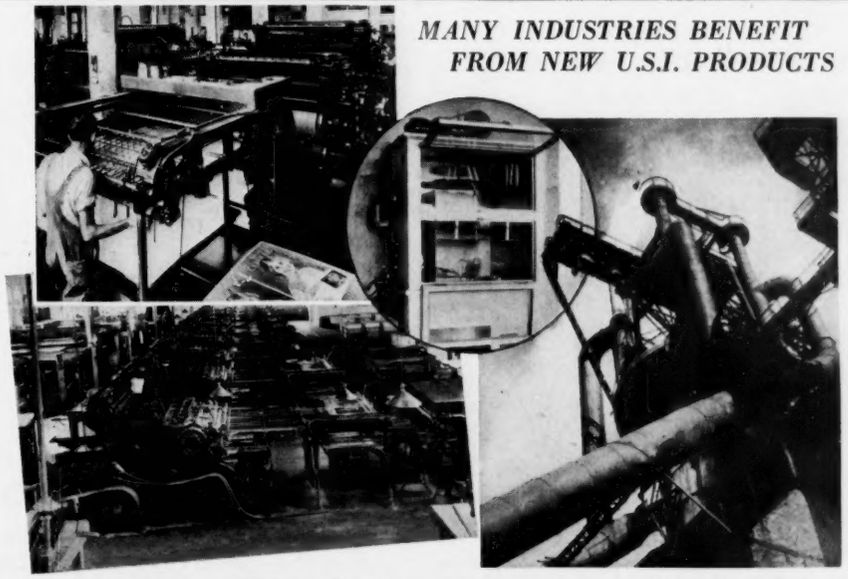
Revocation of four Specially Denatured Alcohol Formulae was made public in Treasury Decision 4727, approved March 4, 1937.

The Decision reads: "Pursuant to authority conferred by the Act of June 7, 1906 (U.S.C., 1934 Ed., Title 26, Sec. 1320), and Title III of the National Prohibition Act, Specially Denatured Alcohol Formulae 11, 26, 31-B, and 31-C are hereby revoked effective May 1, 1937, and alcohol shall not be denatured in accordance with such formulae on or after that date."

S.D. Formula 11 had been authorized for use in the manufacture of photographic collodion, photo engraving and photo prints; S.D. 26 for use in ethylaniline and diethylaniline, dyes and intermediates; S.D. 31-B for liquid soap, shampoo, shaving cream and tooth paste; S.D. 31-C for liquid soap, shampoo, shaving cream and tooth paste.

The discontinuance of these four formulae is not expected to cause any inconvenience among the trade because, it is reported, there have been none or virtually no withdrawals against these particular formulae for the past two years. By this revocation, the number of S. D. Formulae is reduced, but there are several others designated for the same uses.

## *MANY INDUSTRIES BENEFIT FROM NEW U.S.I. PRODUCTS*



**INTO THE PRINTING INDUSTRY (offset at upper left and letterpress at lower left) go Hansa yellow inks. U.S.I. supplies many of the important intermediates for the Hansa yellow pigments. . . . DIBUTYL OXALATE has interesting properties which suggest its use in lacquers (tested for blush resistance in the cabinet shown in oval) and in various branches of the chemical industry.**

ADVERTISEMENT—*This entire page is a paid advertisement.*

APRIL ★ **SOLVENT NEWS** ★ 1937

## NEW LACQUER FINISH DEVELOPED FOR CARS

### Clear Methyl Methacrylate Coat Is Said to Eliminate Chalking

Revision of automobile finishing schedules is imminent should adoption of a new process outlined in a recent patent become general. Attacking the problems of chalking and other common film failures through application of a clear finishing coat of polymerized methyl methacrylate lacquer, the authors of the process claim an effective solution.

When this transparent coat is applied to finishes of the standard nitrocellulose or glyptal types, it is said that a bonding or welding of the two finishes takes place. To this apparent consolidation of the built-up system is attributed unusual resistance to water vapor and chalking which commonly attack ordinary coatings.

It is stated that the polymerized methyl methacrylate lacquer may be plasticized with an acceptable plasticizer such as dibutyl phthalate and a resin to secure adaptability for application over wood and other surfaces requiring a flexible coating.

## STUDY BRAZIL RESIN

Hard Jatoba, one of the Brazilian copal resins, has the important advantage of low cost coupled with a very light color, it was pointed out recently. This together with high solubility in amyl alcohol as well as in drying oils makes it of interest to manufacturers of outdoor varnishes.

It is said to be suitable for blending with the hardest African Copals. Although high Jatoba contents may retard drying and induce film tackiness, liming will eliminate this tackiness, it is asserted.

## TUNG OIL IMPORTS SOAR

In the face of a general decline in imports of all vegetable oils into the U. S. during 1936, imports of tung oil increased more than 11 per cent and those of perilla oil rose more than 16 per cent over 1935, preliminary figures of the Bureau of Foreign and Domestic Commerce reveal.

The totals, which include the oil equivalent of oilseeds, are given by the Bureau as follows:

| | 1936 | 1935 |
|---|---|---|
| **Tung Oil** | 134,829,996 lbs. | 120,058,817 lbs. |
| **Perilla Oil** | 117,903,274 lbs. | 72,327,864 lbs. |

## *Manufacturer of Torches Prefers Solox For Fuel*

Solox, the proprietary alcohol-type solvent of U. S. I., was given additional impetus toward still more widespread use recently when a manufacturer of alcohol-burning torches and halide gas detectors recommended Solox as a fuel. Because it burns without objectionable odor and is clean and inexpensive, Solox is the preferred "alcohol-type" fuel for alcohol lamps, blow-torches, chafing dishes and portable stoves.

This is only one of many uses for Solox which have been developed recently. It is an excellent cleaning agent, is a stronger solvent than ordinary denatured alcohol, and is economical to use. Further information on the advantages and uses for Solox is given in a leaflet available without charge from U. S. I.

## HANSA YELLOW MAKERS SHARE INK BUSINESS

(*Continued from preceeding page*)

develop a domestic supply of another variant form of intermediate, acetoacet-o-chlor-anilid.

Recently they perfected a pure form of acetoacet-ortho-toluidid. Similar in many of its properties to the other acetoacetarylamides, acetoacet-ortho-toluidid is expected to expand manufacture of a wider range of Hansa yellow shades.

Like acetoacetanilid and acetoacet-o-chlor-anilid, it may be coupled with diazotised meta-nitro-para-toluidine, para-chlor-o-nitraniline (also supplied by U.S.I.) or similar products to give a variety of yellows.

Some of the more common shades are Hansa G, 3G, 5G and 10G (See Dec., 1936, *Solvent News*). But these do not exhaust the possibilities, since the skill of the color maker and manipulation of vat temperatures and paddle rotation permit other modifications.

Color makers, however, are emphatic in their assertions that purity of the essential intermediates is of paramount importance to control of cleanliness of tone and tinctorial strength. Sponsored by long experience in the manufacture of other dyestuff intermediates, diethyl oxalate, ethyl acetoacetate, sodium ethyl oxalacetate, etc., U. S. I. chemists have been able to hold tonnage production of Hansa Yellow intermediates within very narrow specifications.

## TECHNICAL DEVELOPMENTS

*Further information on these items may be obtained by writing to U.S.I.*

**Non-toxic solvent cements,** first developed abroad, are now available in this country. They are said to possess strong tack and initial bond, good waterproofing qualities, and continued flexibility. According to the manufacturer they are suitable adhesives for many materials including rubber, plasters, paper, brass, felt, leather, etc.

U S I

**A new liquid ester gum,** recently announced, is said to have such varied uses as a base for adhesives, fixative in perfumes and the formulation of alkali-resistant varnishes. It is described as not only soluble in all the common organic solvents but also as a solvent itself for rubber and numerous gums and waxes.

U S I

**For preventing mold-growth** in glues, inks, adhesives and finishes, the manufacturer of an inhibiting preparation, which is reported to have received exhaustive tests, suggests the application of approximately one part per thousand. It is described as a colorless and almost odorless material soluble in caustic soda or alcohol.

U S I

**An airprinting and aircoloring unit** for making regular and special-shaped colored dots "quickly and economically" is now on the market. The manufacturer states that possible markings also include cupid-bow lips and realistic eyes for dolls, symbols and decorative patterns.

U S I

**An "anti-skinning" agent** recently developed for paints, enamels, etc., is reported to be free from the disagreeable odors common to certain other materials used for this purpose. In several commercial tests as little as 0.2% was used with good effect, it is stated. Other advantages listed are solubility in paints and solvents, no effect on drying or color, and non-toxicity.

U S I

**Formation of rust and corrosion** in steam and condensate lines can be prevented by a new process, according to the developers. It is stated that the chemical used in the process neutralizes and absorbs the corrosive agents, preserving an alkaline condition in the steam and condensate.

U S I

**Metallic effects** can be produced on paper in various colors, according to the manufacturer of a new printing ink. Reported suitable for solid areas and halftones, the ink requires no special handling or equipment.

U S I

**Aluminum paint** especially designed for hot metal surfaces is on the market. The maker states that the paint covers perfectly in one coat, can be applied to hot or cold surfaces, and will not crack, peel or blister at red hot temperatures. It is said to dry rapidly to a silvery finish.

U S I

**A specialty plastic paint** is now available in powder form. It is claimed to be a departure from former plastic paints in that it hardens with rounded edges to a shell resembling Oriental lacquer and it can be ribbed or striated.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**ACETOACETANILID**
**ACETOACET-O-CHLORANILID**
**ACETOACET-O-TOLUIDID**
**ETHYL ACETOACETATE**
**SODIUM ETHYL OXALACETATE**
**PARACHLOR-O-NITRANILINE**

**DIBUTYL OXALATE**
**DIETHYL OXALATE**
**ACETONE**
**ETHYLENE**
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**ETHYL CHLORCARBONATE**

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**POTASH BY-PRODUCTS**

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**Vegetable Oils**
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**Naphthenic Acids**
**Asbestos Fibres**
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**Carob Flour**

**Starkie's synthetic pitch is used extensively in the manufacture of the following: Asphalt Floor Tile, Various Bituminous Products, Insulating Impregnating Compounds, Paints, Paper, Insulation Materials, Waterproofing Materials, Sealing Compounds, Textile Products, Roofing, etc.**

**Write for detailed information regarding the use of this material. It may be the solution to one of your manufacturing problems. We welcome an opportunity to serve you.**

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sales director; W. Hanley, member of the Board; J. L. Arnold, director of promotion; M. A. Dorian, chief chemist; S. S. Berger, comptroller; R. V. Kirk, secretary and plant manager; R. Sedgwick, plant superintendent.

**Locust Control Formula**

The Government of the Union of South Africa reports success in locust control using the formula:—92% bran, 5% low grade sugar, 3% fine arsenic, and 3 parts to the 1,000 coloring matter.

## Paint and Industrial Oils Sharply Higher

### An Easier Tone in Coconut Reported—Spot Stocks of Cod Oil Scarce—Shortage of Olive Oil Threatened—

The paint and industrial oils, principally chinawood, perilla, rapeseed, and linseed, were generally higher in the month just closed. Edible oils were, on the other hand, in relatively poor demand. The fish oils were advanced sharply. Palm oils, with the exception of palm kernel, were in only fair demand at the end of the month. A much easier tone was noted in coconut and the net decline for the month amounted to about 1c. Buyers are said to be holding off waiting to see how large copra arrivals will be when the heavy May-July movement develops. The immediate outlook for soybeans was recently reported as "satisfactory" in a spring outlook report by the Bureau of Agricultural Economics. Outlook for next fall, however, was stated as "less favorable."

Fishing on the West Coast is about over for the season and sales subject to production are said to be about 1,000 tanks under actual production, which explains the firmness in sardine quotations. Cod is scarce. Jap material is offered 58c and Norwegian offerings appear to have been generally withdrawn. Figures showing the acreage intentions on flaxseed are well below last year's figures. This should prove a bullish factor on linseed. February consumption of cottonseed totalled only 181,110 barrels. This proved bearish news for the trade anticipated a consumption of 204,000. A strong possibility of an olive oil shortage is seen in the small crop of olives harvested in Italy last year A decline of 25% in the crop is reported.

There appears to be a great deal of uncertainty on the actual taxes imposed on the various oils. This is particularly true of the smaller buyers. The details are given:

Sec. 701. Tax on certain oils.

The first sentence of Section 601 (c) (8) of the Revenue Act of 1932, as amended, is amended to read as follows:

(8) Whale oil (except sperm oil), fish oil (except cod oil, cod liver oil and halibut-liver oil), marine-animal oil, tallow, inedible animal oils, inedible animal fats, inedible animal greases, fatty acids derived from any of the foregoing, and salts of any of the foregoing; all the foregoing, whether or not refined, sulfonated, sulfated, hydrogenated, or otherwise processed, 3c per lb.; sesame oil provided for in Paragraph 1732 of the Tariff Act of 1930, sunflower oil, rapeseed oil, kapok oil, hempseed oil, perilla oil, fatty acids derived from any of the foregoing or from linseed oil, and salts of any of the foregoing; all the foregoing, whether or not refined, sulfonated, sulfated, hydrogenated or otherwise processed, 4½c per lb.; any article, merchandise, or combination (except oils specified in Section 602½ of the Revenue Act of 1934, as amended, 10% or more of the quantity by weight of which consists of, or is derived directly or indirectly from, one or more of the products specified above in this paragraph or in Section 602½ of the Revenue Act of 1934, as amended, a tax at the rate or rates per pound equal to that proportion of the rate or rates prescribed in this paragraph or such Section 60½ in respect of such product or products which the quantity by weight of the imported article, merchandise, or combination, consisting of or derived from such product or products, bears to the total weight of the imported article, merchandise, or combination; hempseed, perilla seed, rapeseed, sesame seed, and kapok seed, 2c per lb."

Sec. 702. Processing tax on certain oils.

(a) The 1st sentence of Section 602½ of the Revenue Act of 1934 is amended to read as follows:

"(a) There is hereby imposed upon the first domestic processing of coconut oil, palm oil, palm-kernel oil, fatty acids derived from any of the foregoing oils, salts of any of the foregoing (whether or not such oils, fatty acids, or salts have been refined, sulfonated, sulfated, hydrogenated, or otherwise processed), or any combination or mixture containing a substantial quantity of any or more of such oils, fatty acids, or salts, a tax of 3c per lb. to be paid by the processor, but the tax under this section shall not apply (1) with respect to any fatty acid or salt resulting from a previous first domestic processing taxed under this section or upon which an import tax has been paid under Section 601 (c) (8) of the Revenue Act of 1932, as amended, or (2) with respect to any combination or mixture by reason of its containing an oil, fatty acid, or salt with respect to which there has been a previous first domestic processing or upon which an import tax has been paid under such Section 601 (c) (8)."

(b) Notwithstanding the provisions of subsection (a) of this section, the 1st domestic processing of sunflower oil or sesame oil (or any combination or mixture containing a substantial quantity of sunflower oil or sesame oil), if such oil or such combination or mixture or such oil contained therein was imported prior to the effective date of this title, shall be taxed in accordance with the provisions of Section 602½ of the Revenue Act of 1934 in force on the date of the enactment of this act.

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**General Acquires Mechling**

General Chemical has acquired the assets and business of Mechling Brothers Chemical of Camden, N. J. The business, which was established by the Mechling family 68 years ago, will hereafter be conducted as Mechling Bros. Chemicals, Division of General Chemical Co. Benjamin S. Mechling and Edward A. Mechling, president and vice-president, respectively, of Mechling Brothers for a number of years past, will continue actively in the business. Other officers and employees are also expected to retain their connection with the business.

The Mechling plants, located at Camden, N. J., and Medford, Mass., near Boston, produce silicate of soda, hyposulfite of soda, sulfur compounds, insecticides and other chemical products.

**Other Agricultural News**

American Cyanamid has purchased the Air Reduction subsidiary, Calcyanide Co.

Bayer-Semesan is now marketing an improved Ceresan for dusting wheat, oats, and barley seed.

Proposed legislation in N. Y. State would authorize an appropriation of $10,000 for the N. Y. State College of Agriculture, Cornell, to find a non-poisonous substitute for lead arsenate as a spray in fruit-growing.

**Du Pont's Latest Display**

Acting on the invitation of the N. Y. Museum of Science and Industry, located at Rockefeller Plaza, N. Y. City, the du Pont Co. has prepared an elaborate series of presentations of a number of products manufactured by the company. In the main, products have been selected which have direct consumer appeal or about which an interesting consumer story can be given. Formal opening was held on the evening of March 31st. The displays, it is hoped, will serve to acquaint the public with the large interest which the diversified chemical manufacturing industry has had in many lines of manufacture.

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According to the '35 Census of Manufactures writing ink production was up 34% over the '33 total.

MANUFACTURING CHEMISTS SINCE 1849

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# TARTAR EMETIC

# ROCHELLE SALT

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# Packaging, Handling and Shipping

### ¶ Bulk Packaging Symposium Is a Highly Successful Innovation at the Packaging Exposition

The Packaging Exposition, sponsored annually by the American Management Association, and held last month at the Pennsylvania in N. Y. City, was featured for the first time by a bulk packaging program. The idea was first suggested last Spring. Much of the credit for the success of the innovation belongs to R. W. Lahey, Cyanamid packaging expert.

Mr. Lahey reported at the conference that over 1,000,000,000 bags and 7,500,000 18-gauge steel 55-gal. drums were used last year. He stressed the vital necessity for a wider dissemination of information about bulk containers so that shippers may avoid pitfalls and also utilize to the fullest advantage the proper containers best suited for each particular need.

In connection with the conference a symposium on "Current Problems in the Use and Transportation of Drums" was held with Ralph H. Everett of Keystone Varnish in charge.

Various angles of the subject were presented by Norman Babcock, of Carbide; J. B. Wiesel, of Hercules; F. A. Herzog, Electro-Metallurgical; C. W. Clark, duPont; T. P. Callahan, Monsanto; D. G. Stewart, duPont; M. F. Crass, duPont; E. D. Thompson, Stevens Metal Products; H. W. Lees, Draper Manufacturing; Thomas Thompson, Charles Pfizer & Co.

Among the other subjects discussed at the conference were: "The Returnable Container"; "Accounting Methods on Returnable Drums and Cylinders"; "Use of Stainless Steels for Drums." Inner protective coatings for drums were discussed. It developed the consensus of opinion that they were practical and satisfactory on heavy drums. The railroads were criticized for their methods of handling drums which have decorative surfaces. It was stated that fibre drums are not generally suitable for liquids but were entirely satisfactory for pastes and semi-liquids.

Bags were also discussed. Three aspects of the subject were presented. "Bags, Their Construction and Classification," was presented by T. E. Milliman, vice-president of Cooperative G. L. F. Soil Building Service; "Packing, Weighing, and Bag Closing Equipment," was presented by H. H. Leonard, president of the Package Machinery Institute; "Handling and Shipping Bags," was presented by E. L. Chase, production manager for Cooperative G. L. F. Mills.

There were over 70 displays at the Packaging Exposition. The proper procedure for redesigning an old established line was outlined by Designer Gustav B. Jensen and A. C. Michener, advertising manager, John Morrell & Co. The future of plastic packages was discussed by Benjamin F. Conner, plastics division of Colt's Patent Fire Arms. Egmont Arens, noted designer, pointed out some of the hazards of the "family package" idea. He advised the subordination of the trade name in favor of the name of the contents and the use of clear type on labels of family packages to avoid confusion.

James G. Vail, Philadelphia Quartz technical director, reported on the success obtained with the use of clays with silicate of soda, resulting in a shortening of the time required for the silicate of soda to set.

Adhesives and the conditions to be avoided to insure trouble-free gluing were discussed by Frank Greenwald, a National Adhesives' vice-president.

General Hugh S. Johnson was the speaker at the presentation dinner of the All-America Package Competition, sponsored by *Modern Packaging*, held in the grand ballroom of the Hotel New Yorker on March 24th. General Johnson discussed one of the vital problems facing the nation today, "The Labor Situation."

#### Simplification of Container Specifications

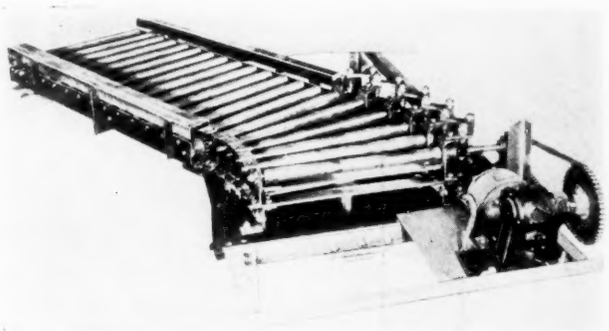
Bureau of Explosives is preparing to suggest to shippers of hazardous products a revolutionary simplification of the official specifications on containers. Tests of serviceability may be substituted for detailed descriptions. Details of the Bureau's plans were outlined at the recent Bulk Packaging Conference by H. A. Campbell, assistant chief inspector. It is believed new method will lead to new ideas in containers.

### Ask Injunction in N. Y. Warehouse Case

Railroads serving New York Harbor have filed in the U. S. District Court for the Southern District of N. Y. a bill for an injunction to restrain an order by the I. C. C. in the so-called N. Y. warehouse case. Order, handed down on Feb. 2, directed the railroads on or before April 15, to cease and desist leasing space and performing storage and handling services in railroad properties for shippers at rents and charges less than the full cost of the railroads, including full depreciation and return on investment.

### Radial Switch for Roller Conveyors

Development by the Standard Conveyor Co., North St. Paul, Minn., of a full-powered radial switch for use with roller conveyors is expected to solve difficult materials handling problems.



Switch permits intermediate discharge of commodities at any one or at numerous points, without any manual effort other than pressing a push button. Many commodities cannot be diverted from power belt or slat conveyors because of their weight or the construction of the carrying surface. The new radial switch is said to overcome these difficulties.

### Container News Items Briefly Told

Bill introduced in the N. Y. State Legislature would prevent sale of inflammable liquids in metal drums of more than 55-gal. capacity. Bill is aimed at tanktrucks in which inflammable materials are shipped.

Crown Can, new subsidiary of Crown Cork & Seal, is making tin cans in a new plant in Philadelphia. Factory is L-shaped, on approximately 17 acres.

The "sit-down" strike at the Chicago plant of Wilson & Bennett Manufacturing, makers of pails and other containers, has been settled. Company is back on regular production basis.

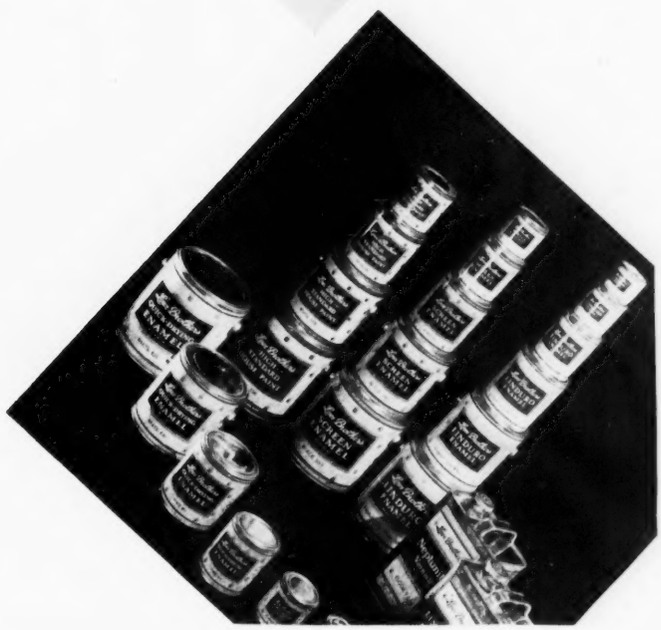
The Petroleum Iron Works Co., Sharon, with N. Y. City sales offices, has issued a new catalog of its steel drums, with the title "Drums Above the Law."

# New Products—
# New Packages

The winners! A pleasing number of chemical specialty containers caught the fancy of the jury of award in the 1936 All-America Package Competition, sponsored by Modern Packaging. All-Nu Products, Camden, N. J., won the bronze award in the "Metal Containers Group" with its attractive family arrangement of Clix auto products.

The bronze award in the "Labels and Seals Group" was given to Lowe Bros. Co., Dayton, Ohio, for its family of paints and allied products. In the "Display Group for Counter, Floor and Shelf," Metal Textile Corp., Orange, N. J., received the bronze award for Chore Girl Metal Cleaner display container shown below.

In the annual packaging contest of the American Management Association, held in conjunction with the Packaging Exposition, du Pont's container for Dulux Marine Finishes was a winner in the "Most Effective Use of More Than One Color Group."



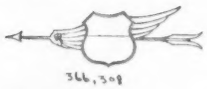
332,215

352,165



362,605

366,096


366,308

366,873

368,734

364,735

369,736

368,737

PUL-MOR-IZED
372,697

372,729

RESIBOND
373,516

OPACITONE
375,451

PARASEPT
376,207

375,101

378,125

NOVAR
377,072

378,699

Solval
380,722

ALUMO
381,312

NOBS
381,776

381,605

381,939

KAR-SKIN
382,664

Lubritorium
383,284

383,293

FORMVAR
383,651

SANI
384,344

384,611

SHU-MEN-IZE
384,535

HERESITE
384,660

sERRASOL
384,985

384,902

MICRONITE
384,934

TEMPLE
385,156

385,157

ROYAL
385,194

ECONOTOP
385,201

385,215

**332,215.** American Sun Texture Products Corp., Jamaica, N. Y.; Nov. 17, '32; plastic wall finish; use since March, '29.

**352,165.** Emulsol Corp., Chicago, Ill.; June 2, '34; interface modifying agents for use in processing and finishing textiles and in other chemical specialties; use since Jan. 1, '29.

**362,605.** A. M. Alexander, Chicago, Ill.; Mar. 16, '35; hand cleanser in cream or paste form; use since July 1, '30.

**366,096.** Gordon-Allen, Ltd., Oakland, Cal.; June 12, '35; clothes washing soap; use since Mar. 15, '35.

**366,308.** Union Oil Co. of California, Los Angeles, Cal.; June 17, '35; oils and greases; use since Sept. '28.

**366,873.** Power Seal Co. (Power Compression Seal Co.), Los Angeles, Cal.; July 1, '35; lubricating motor oils and graphitic lubricant for same; use since Sept. '34.

**368,734.** Angelo Bros., Ltd., Calcutta, India; Aug. 27, '35; prepared shellacs and lacs; use since June '33.

**368,735.** Angelo Bros., Ltd., Calcutta, India; Aug. 27, '35: prepared shellacs and lacs; use since June '33.

**368,736.** Angelo Bros., Ltd., Calcutta, India; Aug. 27, '35; prepared shellacs and lacs; use since June '33.

**368,737.** Angelo Bros., Ltd., Calcutta, India; Aug. 27, '35; prepared shellacs and lacs; use since June '33.

**372,687.** Phillips Petroleum Co., Bartlesville, Okla.; Dec. 16, '35; oils and greases made from petroleum; use since Nov. 12, '35.

**372,728.** Lubri-Zol Corp., Cleveland and Wickliffe, O.; Dec. 17, '35; lubricating oil and grease; use since Nov. 29, '35.

**373,516.** Bakelite Corp., New York City; Jan. 10, '36; abrasive implements; use since Dec. 23, '35.

**375,451.** A. M. Meinecke & Son, Inc., Chicago, Ill.; Mar. 2, '36; pigment filler for paper; use since June 30, '32.

**376,207.** Heyden Chemical Corp., New York City; Mar. 20, '36; organic acid derivatives serving as antiseptics, germicides, anti-oxidants, and preservatives; use since June 5, '35.

**375,101.** Shu-Milk Products Corp., Passaic, N. J.; Feb. 21, '36; white shoe cleaner; use since Jan 24, '36.

**378,125.** Battenfeld Grease & Oil Corp., Kansas City, Mo.; May 7, '36; lubricating grease; use since Mar. 28, '36.

**377,072.** Warren Refining & Chemical Co., Cleveland, O.; Apr. 10, '36; oil base penetrant, water-proofing filler, and seal for floors, etc.; use since Oct 1, '33.

**378,689.** Bon-Pier Co., Canton, Ohio; May 21, '36; dog and animal repellent to protect trees, shrubbery, etc.; use since May 1, '36.

**380,722.** Solval Ltd., Montreal, Canada; July 7, '36; soldering compositions; use since Dec. '35.

**381,312.** Hoganas-Billesholms A-B., Hoganas, Sweden; July 22, '36; electrically fused alumina or bauxite; use since '22.

**381,776.** Nobs Chemical Co., Los Angeles, Calif.; Aug. 3, '36; parasiticides, algaecides, industrial solvents, chemical solvents for use in wells, liquids to prevent corrosive and scale formation and fungicidal growths; use since Aug. 1, '34.

**381,603.** Azienda Italiana Lubrificanti Clarenty Minerali Originali e Vegetali Nazionali, Rome, Italy; July 30, '36; lubricating mineral oils and fats; use since Jan. '26.

**381,939.** Hall Hardware Co., Minneapolis, Minn.; Aug. 8, '36; lubricating oils and greases; use sinces June 1, '35.

**382,664.** Louise Chalkley Given, (Cresson Products Co.), New Hope, Pa.; Aug. 28, '36; automobile wax polish; use since May 18, '36.

**383,284.** Hugo D. Reichert, Salt Lake City, Utah; Sept. 16, '36; lubricating oils, gasoline, cup grease, and gear oil; use since Apr. 8, '33.

**383,293.** Cambridge-Wheatley Co., Cincinnati, Ohio; Sept. 16, '36; ceramic, clay, wall tile glazed and unglazed; use since Mar. 1, '36.

**383,651.** Shawinigan Products Corp., New York City; Sept. 25, '36; synthetic resinous material; use since Mar. 29, '33.

**384,344.** John J. Toner, New York City; Oct. 14, '36; furniture polish having cleaning and disinfecting properties; use since Aug. 1, '36.

**384,611.** Cleveland Converting Co., Cleveland, O.; Oct. 21, '36; polishing and buffing wheels; use since Oct. 7, '36.

**384,535.** Axel E. Johnson (Shu-Men-Ize Waterproofing Co.), Galesburg, Ill.; Oct. 19, '36; preservative compound or preparation for waterproofing leather and leather goods, especially boots, shoes, etc.; use since Oct. 15, '36.

**384,660.** Heresite & Chemical Co., Manitowoc, Wis.; Oct. 22, '36; plastics and synthetic resinous molding powders; use since Dec. 17, '35.

**384,885.** Destileria Serralles, Inc., Ponce, P. R.; Oct. 28, '36; denatured alcohol; use since Mar. '36.

**384,902.** Mid-West Oil Co., Kansas City, Kans.; Oct. 28, '36; lubricating oils and greases; use since Oct. 3, '36.

**384,934.** Rumford Chemical Works, Rumford, R. I.; Oct. 29, '36; abrasive in comminuted form; use since Sept. 26, '36.

**385,156.** Societa Anonima Commercio Cementi Portland, Trieste, Italy; Nov. 4, '36; Portland cement; use since June 20, '31.

**385,157.** Societa Anonima Commercio Cementi Portland, Trieste, Italy; Nov. 4, '36; Portland cement; use since June 30, '31.

**385,194.** National Mortar & Supply Co. of Pittsburgh, Pittsburgh, Pa.; Nov. 5, '36; lime; use since May 7, '31.

**385,201.** Ruberoid Co., Bound Brook, N. J.; Nov. 5, '36; asbestos-cement shingles; use since Jan. 26, '33.

**385,215.** Consolidated Cement Corp., Chicago, Ill.; Nov. 6, '36; Portland cement; use since 1925.

**385,223.** Consolidated Cement Corp., Chicago, Ill.; Nov. 6, '36; Portland cement; use since 1925.

**385,281.** Domestic Products, Inc., Minneapolis, Minn.; Nov. 9, '36; dry cleaning compound; use since June 6, '36.

**385,320.** Western Chemical Co., Kansas City, Mo.; Nov. 9, '36; chemical compound for creating and maintaining an alkaline condition

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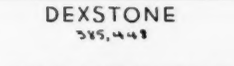

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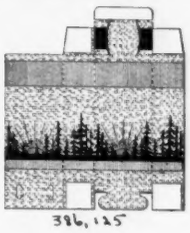
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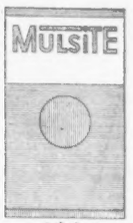

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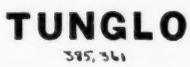

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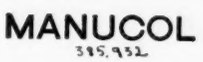

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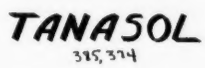

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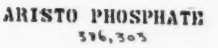

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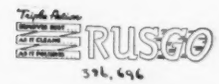

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in boiler, steam, condensate, and water systems for prevention of rust and corrosion; use since Oct. 22, '36.

**385,361.** Mahoning Paint & Oil Co., Youngstown, O.; Nov. 10, '36; paints, varnish, paint enamel, and thinners; use since Oct. 23, '35.

**385,369.** Standard Oil Development Co., Linden, N. J.; Nov. 10, '36; inhibitor for motor oils; use since Sept. 21, '36.

**385,374.** Jacques Wolf & Co., Clifton, N. J.; Nov. 11, '36; chemical preparation for tanning leathers; use since Sept. 9, '36.

**385,424.** Oil Service, Inc., Warren, Pa.; Nov. 11, '36; motor lubricating oils and grease; use since Oct. 17, '36.

**385,456.** Shoe Press Corp., Philadelphia, Pa.; Dec. 7, '36; burnishing ink for finishing soles and heels of shoes; use since Dec. 1, '36.

**385,609.** L. J. Sauerborn (Lubaid Co.), Milwaukee, Wis.; Nov. 16, '36; oiliness concentrate to be added to oils and greases to increase film strength, and to cold-proof oil and grease; use since Sept. 1, '36.

**385,448.** Geo. W. Nickerson (Nickerson Mfg. Co.), Butte, Mont.; Nov. 12, '36; friction block containing substance for use on hands and fingers to prevent slipping; use since Oct. 14, '36.

**385,491.** Philadelphia Quartz Co., Phila., Pa.; Nov. 13, '36 silicate of soda for use in well drilling industry; use since Sept. 10, '36.

**385,651.** Soysein Process Corp., New York City; Nov. 17, '36; vegetable protein for coating and sizing paper; use since Oct. 20, '36.

**385,710.** Wallerstein Co., Inc., New York City; Nov. 18, '36; enzymatic product for use as cleaning compound and for removal protein stains; use since July, '36.

**385,783.** Electro-Chemical Supply & Engineering Co., Paoli, Pa., and Wilmington, Del.; Nov. 20, '36; acid-proof cement; use since Nov. '14.

**385,752.** Rock Products Co., Beloit, Wis.; Nov. 19, '36; fly spray; use since June, 1930.

**385,792.** James M. Jorgensen (Inspecto Co. of America), Los Angeles, Cal.; Nov. 20, '36; cleaner for web or canvas equipment; use since May 1, '35.

**385,804.** Quigley Co., Inc., New York City; Nov. 20, '36; refractory surfacing materials; use since June 15, '36.

**385,819.** Aluminum Ore Co., Pittsburgh, Pa.; Nov. 21, '36; alumina and aluminum compounds; use since July 23, '36.

**385,820.** Aluminum Ore Co., Pittsburgh, Pa.; Nov. 21, '36; lime; gypsum, and for bauxite residues; use since July 23, '36.

**385,868.** U. S. Oil Co., East Providence, R. I.; Nov. 21, '36; lubricating oils and greases; use since Oct. 15, '36.

**385,932.** Manucol Products Ltd., London, England; Nov. 24, '36; alginic acid and salts of alginic acid; use since July 28, '36.

**385,939.** Pyrrole Products Corp., Portsmouth, O.; Nov. 24, '36; quick acting cement for laying shoe soles; use since Aug. 25, '31.

**386,034.** Keene Washing Products Co., Keene, N. H.; Nov. 27, '36; polishing powder for metals, glass, enamel, porcelain, etc.; use since Apr. 18, '35.

**386,125.** Polk Miller Products Corp., Richmond, Va.; Nov. 30, '36; disinfectants; use since Aug. 19, '36.

**386,129.** R. R. Street & Co., Inc., Chicago, Ill.; Nov. 30, '36; size and finish for textile fabrics; use since '11.

**386,134.** Wizard, Inc., Chicago, Ill.; Nov. 30, '36; glass cleaning preparations; use since June 3, '36.

**386,203.** Lyman W. Carr, Fostoria, O.; Dec. 2, '36; coating effecting polishes; use since Aug. '36.

**386,280.** Universal Chemical Corp., Akron, O.; Dec. 3, '36; soap; use since Nov. '36.

**386,303.** Blockson Chemical Co., Joliet, Ill.; Dec. 4, '36; mono calcium phosphate; use since June 16, '34.

**386,387.** Western Waterproofing Co., Detroit, Mich.; Dec. 5, '36; waterproof and weatherproofing compositions for building structures; use since Aug. 1, '26.

**386,458.** Societa Anonima Snia-Viscosa, Societa Nazionale Industria Applicazioni Viscosa, Turin, Italy; Dec. 7, '36; artificial textiles; use since May 26, '36.

**386,420.** Empire Distilling Corp. of N. Y., Yonkers, N. Y.; Dec. 7, '36; anti-freeze compound; use since Oct. 21, '36.

**386,493.** Marvelite Paint Co., Balto., Md.; Dec. 8, '36; paints, enamels, shellacs, varnishes, lacquers, paint thinners-oils-pigments, putties and wood and metal fillers; use since Oct. '36.

**386,608.** Tobacco By-Products & Chemical Corp., Louisville, Ky.; Dec. 10, '36; parasiticides; use since Nov. 16, '36.

**386,611.** Ward Chemical & Mfg. Co., Inc., New York City; Dec. 10, '36; powdered or granular soap, detergents for cleaning metals and other technical cleaning operations; use since July 18, '36.

**386,615.** Tobacco By-Products & Chemical Corp., Louisville, Ky.; Dec. 10, '36; parasiticides; use since Nov. 16, '36.

**386,661.** Refiners to Dealers, Inc., Lockport, N. Y.; Dec. 11, '36; motor lubricating oils and greases; use since Aug. 1, '36.

**386,696.** Rusgo Mfg. Co., Milwaukee, Wis.; Dec. 12, '36; chromium polish which also removes rust; use since Sept. 9, '36.

**386,679.** Vito Giannola (Super Nu-Wash Cleanser Co.), St. Louis, Mo.; Dec. 12, '36; general cleaning compound; use since Jan. '35.

**386,726.** Eaton-Clark Co., Detroit, Mich.; Dec. 14, '36; chemical bleaching preparations, particularly for laundry and dry cleaning industries; use since Oct. 13, '10.

**380,938.** Worthington Pump & Machinery Corp., Harrison, N. J.; July 11, '36; ferrous metal; use since Mar. 20, '36.

**386,735.** I. F. Laucks, Inc., Seattle, Wash.; Dec. 14, '36; plastic wall coatings; use since Dec. 10, '36.

**386,779.** Rohm & Haas Co., Phila, Pa.; Dec. 15, '36; textile finishing agent and printing assistant for use with vat colors; use since Dec 4, '36.

**386,802.** Gulf Oil Corp., Pittsburgh, Pa.; Dec. 13, '36; auto cleaner and spot remover; use since Nov. '34.

**386,808.** I. F. Laucks, Inc., Seattle, Wash.; Dec. 16, '36; plywood and veneer; use since Dec. 1, '36.

**386,815.** Penn City-National Oil Co., Phila., Pa.; Dec. 16, '36; motor lubricating oil; use since Jan. '32.

**386,921.** Richard J. Wooldridge, Glastonbury, Conn.; Dec. 18, '36; aluminum welding rods and electrodes; use since Dec. 4, '36.

**386,949.** Kepec Co., Milwaukee, Wis.; Dec. 19, '36; leather preservatives or dressings; use since Oct. 19, '35.

**386,950.** Kepec Co., Milwaukee, Wis.; Dec. 19, '36; ready mixed liquid paints, paint enamels, lacquers; use since Oct. 19, '36.

**386,958.** National Solvents Co., Washington, D. C.; Dec. 19, '36; liquid polishing wax; use since May 1, '35.

**386,984.** Jules Donshick, Oakland, Calif.; Dec. 21, '36; metal polish in powder form; use since Nov. 11, '36.

**386,994.** Elmer T. Keys (E. T. Keys Co.), Balto., Md.; Dec. 21, '36; laundry bleach; use since Aug. 21, '35.

**386,999.** Lithgow Corp., Chicago, Ill.; Dec. 21, '36; paints, enamels, lacquers; use since Dec. 20, '35.

**386,997.** Bertha S. Johnson (Montrose Chemical Co.), Lowell, Mass.; Dec. 21, '36; fertilizers; use since Nov. 21, '36.

**387,013.** Pinol Mfg. Co., Inc., Phila., Pa.; Dec. 21, '36; paint enamels, ready mixed paints; use since May 11, '34.

**387,037.** Estate of Sam. Hecht (Harlem Chemical Co.), Long Island City, N. Y.; Dec. 22, '36; lighting fluid; use since Dec. 1, '36.

**387,120.** General Chemical Co., New York City; Dec. 24, '36; insecticides and preparations for control of plant pests; use since Oct. 9, '36.

**387,122.** General Chemical Co., New York City; Dec. 24, '36; insecticides and preparations for controlling plant pests; use since Nov. 10, '36.

**387,136.** Leeds & Northrop Co., Phila., Pa.; Dec. 24, '36; reagents, reagent mixtures, oxygen-containing hydrocarbons, fusel oil, for use in carburization and prevention of decarburization of ferrous metals; steels and alloys; use since May 15, '36.

**387,142.** B. G. Pratt Co., New York City; Dec. 24, '36; insecticides; use since Sept. 11, '36.

**387,217.** Society of Chemical Industry in Basle, Basel, Switzerland; Dec. 28, '36; auxiliary agent in textile industry; use since Mar. 3, '33.

**387,155.** Whittemore Bros. Corp., Cambridge, Mass.; Dec. 24, '36; compositions for cleaning, dressing, polishing sheet materials, e.g., shoe leather and shoe fabrics; use since May 24, '13.

**387,218.** Society of Chemical Industry in Basle, Basel, Switzerland; Dec. 28, '36; auxiliary agent for textile industry; use since Jan. 20, '34.

**387,219.** Somay Products, Inc., Miami, Fla.; Dec. 28, '36; cement-base paint in powder form; use since '33.

**377,302.** Colgate-Palmolive-Peet Co., Jersey City, N. J.; Apr. 17, '36; industrial alkali; use since Jan. '36.

**387,220.** Somay Products, Inc., Miami, Fla.; Dec. 28, '36; water paint; use since '33.

**387,221.** Special Chemical Corp., New York City; Dec. 28, '36; cleaning mixtures used in plating and finishing metals; use since Apr. 6, '35.

**387,283.** Harry Morton Lechan (Lechan Products Co.), Fall River, Mass.; Dec. 30, '36; insecticides; use since Feb. 2, '34.

**387,289.** Salvatore Sessa (Industrial Chemical Powder Co.), New Haven, Conn.; Dec. 30, '36; rust preventing compounds for automobile radiators; use since June 15, '36.

**383,597.** R. C. A. Rubber Co., Akron, O.; Sept. 24, '36; rubber composition flooring and wall material; use since Apr. 21, '36.

**387,310.** Binney & Smith Co., New York City; Dec. 31, '36; dry color art medium for dry color painting; use since Apr. 22, '35.

**387,327.** Robt. Humphreys (Humphreys Specialty Co.), Rochester, N. Y.; Dec. 31, '36; oil plastic texture wall paint; use since Nov. 1, '36.

**387,494.** Brooks Paper Co., St. Louis, Mo.; Jan. 6, '37; bags constructed of wax paper, Cellophane, Glassine, etc.; use since Feb. 28, '35.

**387,394.** Pure Oil Co., Chicago, Ill.; Jan. 2, '37; denatured alcohol and radiator antifreeze compositions; use since Oct. 26, '36.

**387,441.** Wm. Korn, Inc., New York City; Jan. 4, '37; lithographic rubbing ink-liquid and stick tusche and transfer ink; autographic and music plate transfer inks; use since 1897.

**387,430.** Black Diamond Paint & Varnish Works, Inc., Cincinnati, O.; Jan. 4, '37; belt dressings; use since 1906.

**387,444.** Rockland Chemical Co., Newark, N. J.; Jan. 4, '37; use since Jan. '31.

**387,447.** Virginia-Carolina Chemical Corp., Richmond, Va.; Jan. 4, '37; mono calcium phosphate; use since Dec. 11, '36.

**387,449.** Atlas Supply Co., Newark, N. J.; Jan. 5, '37; hydraulic brake fluid for automobiles; use since Dec. 8, '36.

**387,490.** Binney & Smith Co., New York City; Jan. 6, '37; water colors; use since Dec. 18, '36.

**387,582.** R. T. French Co., Rochester, N. Y.; Jan. 8, '37; antiseptic and germicide; use since Dec. 29, '36.

**387,603.** United Carbon Co., Inc., Charleston, W. Va.; Jan. 8, '37; carbon black for use in explosives; use since Nov. 4, '36.

**387,608.** Hamilton Chemical Products Co., Brockton, Mass.; Jan. 7, '37; liquid cements; use since Feb. 20, '36.

**387,713.** Semet-Solvay Co., New York City; Jan. 12, '37; protective paints and roof coating; use since '25 on roof coating; since Jan 1, '02 on paints.

**387,991.** E. I. du Pont de Nemours & Co., Wilmington, Del.; Jan. 21, '37; plastic material; use since May 21, '36.

**375,450.** A. M. Meinecke & Son, Inc., Chicago, Ill.; Mar. 2, '36; pigment filler for paper; use since May 15, '31.

**387,818.** Chilean Nitrate Sales Corp., New York City; Jan. 15, '37; nitrate of soda; use since Oct. 2, '36.

# CHEMICAL NEWS & MARKETS

**E. T. Asplundh, recently elected Director, Columbia Chemical Division, Pittsburgh Plate Glass Co.**

## BENZOLS, TOLUOL, XYLOL AND OTHER DISTILLATES

Save time and money with Barrett's convenient express tank-truck deliveries of coal-tar distillates. This service is available within a radius of fifty or sixty miles of thirteen important industrial centers situated from coast to coast. Elsewhere, Barrett distillates are delivered in tank cars or drums.

Phone, wire or write for complete details *now*! Let us tell you more about the advantages of our "direct-to-your-own-storage-tanks" service.

**OTHER BARRETT CHEMICALS** Arcadian*, the American Nitrate of Soda • Sulphate of Ammonia • Anhydrous Ammonia • Ammonia Liquor • Barretan* • Benzol, *Pure and 90%* • Chlor Meta Xylenol • Cresols, *U. S. P., Refined Ortho, Meta and Para, Special Fractions* • Cresylic Acid, *Straw Color and Dark* • Cumar*, *Paracoumarone-indene Resin* • Flotation Oils and Reagents • Hi-Flash Solvent • Hydrocarbon Oil • Naphthalene, *Crude, Refined Chipped, Flake, Ball and Nugget* • Para-Chlor-Meta Cresol • Phenol (*Natural*), *40° M. Pt., Technical 39° M. Pt., Technical 82-84% and 90-92%* • Pickling Inhibitors • Picolines • Pyridine, *Refined, Denaturing and Commercial* • Quinolines • Rubber Softeners • Shingle Stain Oil • Solvent Naphtha • Special Heavy Oil • Tar Acid Oils • Toluol • Xylenols • Xylol. (*Trade-mark of The Barrett Co., Reg. U. S. Pat. Off.)

**THE BARRETT COMPANY, 40 Rector Street, New York, N. Y.**

# MELLON INSTITUTE DEDICATION MAY 5th

## Under Construction 6 Years, Occupies Entire City Block—Plants in Kanawha Valley Announce Wage Increases—F. T. C. Hits Chilean Nitrate Advertising—

The new Mellon Institute building in Pittsburgh will be dedicated May 5-9th. The New Institute building, which replaces the older one which has been in use for 22 years, is to be dedicated in the presence of eminent scientists in honor of Andrew W. and the late Richard B. Mellon, who founded the Institute in 1913.

Appearing before a meeting of the Institute's research staff, comprising 155 scientists identified with 64 industrial fellowships at present under way, Director Edward R. Weidlein gave the first word as to plans for the new building's opening.

The new structure, occupying much of a city block and built down into the ground so that its nine broad stories seem like only five, has been under construction for 6 years. It replaces the building on the University of Pittsburgh campus, which has been the Institute's home for the last 22 years.

Mellon Institute has been called "a guild of scientists woven into a team for the promotion of comprehensive pure and applied research on important problems of humanity." Its system of industrial fellowships as a partnership between science and industry is an outgrowth of an idea voiced in 1907 by Robert Kennedy Duncan, widely known professor, student and writer along scientific lines, who established the first experimental fellowships at the University of Kansas. In 1910 he was invited to try out the partnership or fellowship idea in a special department of the University of Pittsburgh, and began the first fellowship there in the following year.

Andrew W. Mellon and Richard B. Mellon, who had been familiar with Duncan's idea and noted its soundness, saw in the system a practicable method of benefiting industry. As a result of this interest, in 1913, they founded Mellon Institute at the University of Pittsburgh, and later placed the industrial fellowship system and pure research activities on a permanent basis.

Beginning as it did on a modest scale, the Institute's industrial fellowship procedure has to date served 3,600 companies, individually or as members of industrial associations. About 650 novel processes and products have been invented or developed by Fellows of the Institute. In 10 instances, fellowship inventions have created new industries, and, through many of their accomplishments, new branches have been added to existing manufactures in a wide field of chemical technology.

The Institute's board of trustees includes Andrew W. Mellon, Richard K. Mellon, John G. Bowman, Henry A. Phillips and Edward R. Weidlein. Besides Dr. Weidlein, the Institute's executive staff is comprised of Dr. E. Ward Tillotson, Dr. William A. Hamor, Harry S. Coleman, Dr. George D. Beal, and Dr. Lawrence W. Bass, assistant directors, and Dr. Leonard H. Cretcher, assistant director and head of the department of research in pure chemistry.

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### C. I. O. at Charleston

The major chemical industries operating in the Kanawha Valley, W. Va., announced on March 12th general wage increases for hourly or pay roll employees of approximately 10%, and the establishment of minimum wage rates. Approximately 7,400 workmen are affected.

Managers of the various important chemical plants in the area emphatically denied that the activity of William Blizzard, vice-president of district No. 17, United Mine Works, and the chief of the C. I. O. organizers now in the district, had influenced the decision to raise wages, declaring that such rises in the rates have been under consideration for several weeks.

At the du Pont plant, J. L. E. Cheetham, manager, stated to newspaper representatives that several weeks ago payroll employees through their organization asked for a wage increase and the establishment of a minimum wage rate. He said since that request, company officials had been working on the request.

Effective on March 16, about 2,800 employees at the du Pont plant received a 10% increase in wages and the $5 minimum was established. Mr. Cheetham said that the former minimum for payroll employees was $4.25. The raise will also affect, he said, some of the company's salaried employees.

At the Carbide plant, R. N. Graham, manager, said that the increase in that plant became effective on March 14th, and that the increase was "approximately 10%."

Mr. Graham said "definitely a minimum wage rate will be put into effect, but as yet company officials have not reached a decision as to just what it will be."

Organizer Blizzard has declared that the salary raises just granted are merely "bait." He reports that several hundred men at the du Pont plant are already members of the C. I. O. Comprehensive plans are being laid by the union officials for enlarging the scope of the union's activities in the Kanawha Valley. The new district will be known as No. 50 and will be an affiliate of the miners' organization.

Twenty-five organizers of the C. I. O. have been assigned to the Kanawha Valley to carry out the labor union's plans for taking virtually all large groups of workmen into Lewis' group.

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### Alleges Unfair Methods

Use of unfair methods of competition involving false and misleading advertising in promoting the sale of Chilean nitrate of soda, is charged in a complaint issued by the Federal Trade Commission against Chilean Nitrate Sales. Also named as a respondent is Chilean Nitrate Educational Bureau, Inc., a subsidiary disseminating advertising material for Chilean Nitrate Sales.

In addition to advertising in newspapers, magazines and circulars to purportedly describe the efficacy of nitrate of soda imported from Chile, the respondent corporations are said to have made and exhibited to large audiences of purchasers and prospective purchasers of their product, a motion picture with dialogue, divided into two distinct sections.

The first part of the film portrayed the mining and refining operations and other details necessary to bring the respondent corporations' product to the American farmer. The second section, according to the complaint, was a photographic history of an experiment in which the effect of Chilean nitrate of soda on plant growth is compared with the effect of synthetic nitrate of soda.

The complaint alleges that the respondent corporations prepared and presented the material in their advertising matter and motion picture in such manner as to represent falsely, either directly or by implication:

That soil generally found in agricultural districts is lacking in the minor elements, boron and manganese, a deficiency that can, under all conditions, be supplied by use of Chilean nitrate of soda, which is more effective because it is a natural and not a synthetic product; that use of Chilean or natural nitrate of soda is the only efficient way to build up soil deleted of boron and manganese so as to properly support plant life and growth; that the experiment portrayed in the motion picture was not conducted with sterile sand but with material similar to soil generally found in agricultural districts; that the chemically pure laboratory salts used in such experiment were domestic commercial products, and that the results obtained during the experiments were similar to those to be expected from the use, under ordinary farming conditions, of Chilean nitrate of soda.

Regarding these allegedly false representations on the part of the respondent corporations, the complaint sets out that soil generally found in agricultural districts is not deficient in boron and man-

ganese; that where such a deficiency occurs it cannot, under all conditions, be supplied by use of Chilean nitrate of soda; that boron and manganese may be added in sufficient quantities to commercial synthetic nitrate of soda to build up soils lacking in these elements so as to be as effective as a natural product, and that use of Chilean or natural nitrate of soda is not the only efficient way to build up soil.

Complaint further alleges that the experiment filmed by the respondent corporations was not conducted with material similar to that usually found in agricultural districts, that the salts used in the tests were not commercial but were non-commercial laboratory-produced materials and that the results obtained during the experiments portrayed are not similar to those to be expected from use of Chilean nitrate of soda under ordinary farming conditions.

H. C. Brewer, director of agricultural research for the company, is reported in a newspaper interview to have declared that "the motion picture referred to in the complaint consisted first of a film of scientific laboratory experiments. The latter section of the film," he stated, "was actually made by the N. J. Experiment Station, and was based upon experiments conducted by it." The experiments shown, Mr. Brewer asserted, are entirely in line with accepted scientific methods and have received general scientific acceptance.

"We are at a complete loss to understand how the exhibition of either this original film or of the scientific film prepared by one of the leading experiment stations in the country can possibly be made the basis of a charge of false or misleading advertising," Mr. Brewer declared.

"As to the advertising matter referred to in the complaint, no statement has been used in the company's advertising that is not supported by independent scientific researches of recent years," he concluded.

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**Fair Space Available**

The New York World's Fair has announced its scale of prices for exhibit space in the great 1939 exposition in Flushing Meadow Park, Queens. For building lots the base price will be 20c per sq. ft., for interior exhibit space $14 per sq. ft.

Announcement made by Grover Whalen, president, constituted in effect an invitation to business and industry and the arts and sciences to start preparing their own Worlds of Tomorrow for 1939. Mr. Whalen said discussions would begin at once with the hundreds of firms which had inquired about participating in the Fair. Many of these were said to have been waiting only for information about lot areas and space charges to begin making definite plans for their exhibits.

The Fair Corporation has placed on the market 75 acres of building lots and has announced that 450,000 sq. ft. of net floor space would be available for exhibitors in the buildings which the Fair itself would erect.

The Fair came up for discussion at a recent informal dinner meeting of a group of plastics manufacturers. Since the subject holds considerable interest for the entire industry, a committee was named to consider methods most appropriate and effective for participation. Members of this committee are Stanhope Nixon, Nixon Nitration Works, Nixon, N. J.; Louis M. Rossi, Bakelite; and James L. Rodgers, Plaskon.

## *COMING EVENTS*

**American Institute of Mining & Metallurgical Engineers,** Open Hearth Conference, Birmingham, Ala.

**American Chemical Society,** 93rd Meeting, Chapel Hill, N. C., April 12-15.

**International Association for Testing Materials, 2nd International Congress,** London, April 19-24, '37. K. Headlam-Morley, 28 Victoria st., London, S. W. 1.

**Electrochemical Society,** 71st meeting, Philadelphia, April 28-May 1.

**14th Midwest A. C. S.** Regional Meeting, Omaha, April 29-May 1.

**Spring Meeting of the Tanners' Council of America,** The Greenbrier, White Sulphur Springs, W. Va., May 3-4.

**Porcelain Enamel Institute Forum,** University of Illinois, May 5-7.

**National Rayon Technical Conference,** Washington, D. C., May 14-15.

**American Gas Association,** Production and Chemical Conference, N. Y. City, May 24-26.

**National Association of Purchasing Agents,** annual meeting, Hotel William Penn, Pittsburgh, May 24-27.

**Third Dearborn Chemurgic Conference,** Dearborn, Mich., May 25-27.

**American Association of Cereal Chemists,** annual meeting, Nicollet Hotel, Minneapolis, May 24-28.

**American Institute of Chemical Engineers,** semi-annual meeting, Toronto, Canada, May 26-28.

**American Petroleum Institute,** mid-year meeting, Colorado Springs, Colo., June 1-3.

**N. Y. State Sewage Works Association,** Utica, N. Y., June 4-5.

**Pacific Northwest Section,** American Water Works Association, Empress Hotel, Victoria, B. C., June 4-5.

**American Gas Association,** Industrial Gas Section, Chicago, June 8-9.

**American Leather Chemists' Association,** Royal York Hotel, Toronto, Canada, June 8-10.

**American Water Works Association,** annual convention, Hotel Statler, Buffalo, N. Y., June 7-11.

**14th Colloid Symposium,** Minneapolis, Minn., June 10-12.

**Second World Petroleum Congress,** Paris, Maison de la Chimie, June 14-19.

**American Society for Testing Materials, 40th Annual Meeting, Waldorf-Astoria, N. Y. City, June 28- July 2, '37.**

**"Achema VIII," Plant exhibition, in connection with 50th General Meeting of Verein Deutscher Chemiker, Frankfurt, Germany, Sept., 1937.**

**American Chemical Society, 94th Meeting, Rochester, N. Y., Sept. 6-10, '37.**

**National Safety Council,** Kansas City, Mo., Oct. 11-15.

**American Gas Association,** annual meeting, Oct. 11-16.

**American Society for Metals,** Congress and Exposition, Atlantic City Auditorium, Atlantic City, Oct. 18-21.

**American Association of Textile Chemists & Colorists,** annual meeting, Bellevue-Stratford Hotel, Philadelphia, Dec. 3-4.

**Exposition of Chemical Industries, Grand Central Palace, N. Y. City, Dec. 6-11, '37.**

**LOCAL TO NEW YORK***

April 23rd, A. I. C.

May 7th, A. C. S. annual meeting.

May 21st, A. I. C. annual meeting, N. Y. Chapter.

* Chemists' Club unless otherwise noted.

**To Study Foreign Dyeing**

American industrialists will have an opportunity to observe developments in European dyeing research this summer during a unique tour of scientific laboratories being arranged by the National Research Council's Division of Engineering and Industrial Research. About one hundred prominent bankers and industrialists are expected to participate in the tour which will enable them to visit such world-famous scientific laboratories as the Cavendish Laboratory, in Cambridge, England; the Cotton Research Laboratories, and the Imperial Chemical Industries of England; l'Ecole Central des Arts et Manufactures, the Creusot laboratories and the Chemical Industry of France, and the Kaiser-Wilhelm Institut for Chemistry of Fibrines in Germany.

The group will sail May 14th from N. Y. City in the *Champlain*, according to present plans. Travel arrangements are being made by the American Express Co.

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**New Brown Chemical "Lab."**

A gift of $500,000 to Brown University to construct a new chemical research laboratory has been made by Jesse H. Metcalf, former U. S. senator from Rhode Island and a member of Brown's Board of Trustees. Fund will be used to build and endow a laboratory "with unsurpassed facilities" for research in specialized phases of electrochemistry and photochemistry, fields of increasing importance in the scientific and industrial worlds. The new building will more than double Brown's present accommodations and equipment for research in chemistry.

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## Associations

***¶ A. I. Ch. E. Moves Headquarters to N. Y. — Set Date for Leather Chemists' Meeting — Lichtenberg Heads Salesmen —***

A. I. Ch. E. headquarters are now in N. Y. City in the Engineering Societies Bldg. Stephen L. Tyler, chemical engineer with the Thermal Syndicate, Ltd., Brooklyn, is the new executive secretary, succeeding Frederic J. LeMaistre, Philadelphia consultant. The new secretary is Yale, '11 and the designer of the Tyler absorption unit widely used in hydrochloric production. He was the first chairman of the N. Y. section.

**Leather Chemists' Plans**

Chief researcher for the Tanners' Council, Dr. Fred O'Flaherty, says that novel innovations will feature the annual meeting to be held June 8-11th, at the Royal York, Toronto. Sky Top has been temporarily abandoned for a return engagement to Canada after an absence of 10 years. An interesting round-table discussion on chrome and vegetable tanning

will be one of the features. Informal evening meetings will also be held to discuss the formal papers. J. G. Niedercorn, Cyanamid, is associated with Dr. O'Flaherty on the program committee.

**Salesmen Elect Lichtenberg**

Charles Lichtenberg, Commercial Solvents, is the new president of the Salesmen's Association; Charles E. Kelly, Hagerty Bros., vice-president, De Witt Thompson, Mathieson Alkali, secretary, and J. M. Wafer, Industrial Chemical Sales, is treasurer. "Bart" Sheehan, du Pont, is the new chairman of the executive committee.

**Kendall Touring Country**

A hearty welcome was accorded Prof. James E. Kendall on April 9th when he spoke before the N. Y. Section of the Society of Chemical Industry and the A. C. S. at the Chemists' Club in N. Y. City. He is on an American tour from Edinburgh, where he is head of the chemistry department at the university. Prof. Kendall is well known to chemists in this country. He taught at Columbia and at N. Y. U. for several years before returning in '28 to his alma mater. He reported on the Faraday Society symposium on "Liquids and Solutions," held last September at Edinburgh.

Prof. Kendall spoke before the Connecticut Section of the A. C. S. in New Haven on April 2nd. He was the guest of honor at a tea given by Mr. and Mrs. Williams Haynes and attended by a group from the Yale faculty.

**P. A.'s To Meet May 24-27th**

Ninety exhibits of industrial products and processes (many of them chemical) will be presented at the Inform-a-Show, held in conjunction with the annual "get-to-gether" of the nation's purchasing agents at the Hotel William Penn, Pittsburgh, May 24-27th.

**Association Briefs**

The '37 convention of the cereal chemists will be held at the Nicollet Hotel, Minneapolis. A feature promised is the attendance of several European investigators. F. A. Collatz, General Mills, Inc., Minneapolis, is chairman of the local committee.

Textile chemists belonging to the N. Y. chapter of the A. A. T. C. & C. listened to Ephraim Freedman, R. H. Macy & Co., discuss "Consumer Problems" at the March meeting.

The golden anniversary jubilee of the N. Y. Paint, Varnish and Lacquer Association was held April 7th at the Waldorf-Astoria. Ernest T. Trigg, president of the National P. V. & L. A., attended.

Omaha has been selected as the place for the Midwest Regional Meeting of the A. C. S. Meeting will open on Thursday, April 29th, and will continue through the forenoon of Saturday, May 1st. Headquarters will be at the Hotel Paxton.

# Japan Adopts "Ersatz" Program for Fuels

## Japanese Industry Expands — British Chemical Industry Behind in General Recovery in '36—Petroleum Chemists to Meet in Paris—Other Foreign News—

Reports from Japan indicate that that country is seriously planning to emulate the German "ersatz" program in the matter of synthetic fuels. Japan's search for domestic sources has failed and current production is only 2,000,000 barrels a year. Intensive work is under way on the carbonization of coal at low temperature, liquefaction of coal by hydrogenation, and the synthetic production of liquid fuel. The great Mitsui interests have obtained rights on the German Fischer process of coal liquefaction. Japan is introducing a novel foreign trade statistics tax on all commercial exports and imports at the rate of 0.1% ad valorem to be used for a statistical survey of foreign trade.

The Japanese chemical industry continued its expansion program last year with new capital placed at 153,325,000 yen, approximately the same amount as the previous year. However, more attention was given to expanding existing facilities, rather than the establishment of new companies. The anticipated overproduction and the development of an exportable surplus did not materialize. Large quantities of ammonium sulfate were imported. Dyestuff makers introduced several important higher grade colors and intermediates. Despite this, however, imports reached the highest level since '29 and exports declined substantially, indicating the consuming industries' demands were heavy.

The Tokyo Chamber of Commerce and Industry will send in May a dozen or more members to Brazil, Argentina, Chile and other South American countries to develop markets for Japanese chemicals. They will go equipped with films showing the development of the chemical industry. This decision was reached by the chamber after a study which indicates the possibilities of extension of trade for chemicals in South America. Party will try to open up new markets for pharmaceuticals, rubber, plastics, soap and dyes.

Before the chamber's representatives sail for Yokohama, however, a Chilean commission will have arrived in Japan as guests of the Jap government. A reciprocal trade agreement between the two countries is the object of the mission. Japan seeks to break down the import quota system and Chile hopes to increase nitrate exports to the Orient.

**Advance In German "Ersatz" Plans**

The German "ersatz" program moved definitely a step further in actual accomplishment last year with the development of a process for making carbon black from naphthalene. The practical result of this discovery is shown in the decline of imports in the first 11 months to 6,595 metric tons, as against 10,462 tons in the same months of '35.

In line with the national policy of reducing dependence upon foreign sources, Germany is now recovering liquid rosin as a by-product from sulfate pulp at two plants with a combined production of 1,000 tons annually. Additional units are planned.

**Not a Business Barometer**

The British Chemical industry did not merit its reputation as a "barometer of British business" in '36 but as the year closed there were unmistakable signs that the industry was rapidly approaching the high level of production enjoyed by most manufacturing units. However, production in each quarter was ahead of the corresponding period of '35. Most encouraging was the consumption of heavy chemicals and dyes. Until the closing quarter exports were disappointing, total for the year reaching £25,186,000 against £25,428,000 in '35. Imports rose from £19,465,000 to £20,300,000. British chemical makers are disturbed at the failure of exports to increase.

In contrast, the French chemical industry was marked with unusual activity in '36, particularly in the closing months. Manufacturer's stocks were at a low point. Dye production was up 10%; a similar gain was reported for sulfuric. French and Portuguese naval stores producers were helped by the absence of Spanish competition.

With international interest in synthetic fuels at a fever heat as a result of the "ersatz" programs of several important countries, and quite comparable to the situation in nitrogen a decade ago, the Second World Petroleum Congress to be held in Paris June 14-19th is likely to attract a record attendance. Details of the meeting are available from the secretary of the Institution of Petroleum Technologists, 10-13, Bedford st., London, W. C. 2, England.

Chemical engineers will find much of interest at the meeting of the International Association for Testing Materials which is scheduled for London, April 19-24th. One sub-group of papers will cover the chemical properties, particularly with corrosion resistance of metals and alloys; another will deal with timber preservation; and a third will deal with paints and varnishes. A special exhibit of plant equipment and control apparatus will also be a feature.

**Foreign Notes**

The British rubber firm of Symington and Wilson in its annual circular reports that German synthetic rubber costs about 5 marks per kilog to produce. The government pays a subsidy of one mark per kilog.

A recently incorporated English company, capitalized at £500,000, has applied for permission to acquire prospecting licenses which cover phosphate rock deposits near the Red Sea and in the Nile valley.

A new sulfur refinery which handles 7,000 metric tons of ore monthly and has a daily capacity of 100 tons of sulfur recently began operations in Chile near the Bolivian frontier.

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**High Mark In Exports**

January exports of chemicals and related products were the highest for any January in recent years despite the marked contraction in foreign demand for American fertilizers. While exports of fertilizers in January amounted to only 61,000 tons—the smallest amount reported for any month in the past two years—decreases recorded in this classification were more than offset by spectacular increases in export shipments in ready mixed paints and varnishes, insecticides, disinfectants, polishes, plastic materials, synthetic resins, soaps, heating and refrigerating gases, and a number of other high grade specialties.

Total value of all chemicals and related products exported in January aggregated $12,147,000 compared with shipments valued at $11,584,000 in January, '36; $9,298,000 in January, '35; and only $6,858,000 for January 1933.

Chemical specialties headed the list in January with total exports in this classification reaching the value of $2,081,800—a value increase of more than 60% compared with January, '36, during which year the total was recorded at $1,298,000.

**Territories Take 19% More**

Shipments of chemicals and related products from continental U. S. to Hawaii, Puerto Rico and Alaska advanced approximately 19% in '36 compared with '35 and were more than 26% greater than the value of shipments to these areas in '34. These areas purchased a total of $13,843,500 in '36 compared with $11,703,000 during the preceding year and $10,950,000 in '34.

Each territory increased its chemical purchases from the mainland during the year, the largest gain being recorded in sales to Puerto Rico.

**January Demand For Paints**

Foreign demand for American paint products was especially good in January, particularly for ready mixed paints, varnishes, lacquers, and carbon black. Exports of paint products aggregated $1,622,000, with shipments going forward to almost every country of the world, and represented an increase of approximately 28% over the value of similar exports in January, '36, during which month the total was recorded at $1,265,550.

Territories of Hawaii, Puerto Rico, and Alaska, purchased $1,739,000 of paint products from mainland manufacturers last year, an increase of 9% over purchases in '35, during which year the total was recorded at $1,594,000, according to C. C. Concannon, Chief of the Commerce Department's Chemical Division.

**Oil Imports Decline**

U. S. imports of drying oils contracted sharply in January. Only 4,227,000 lbs. of tung oil were brought in during the month, compared with 12,573,500 lbs. in January last year and receipts of perilla oil were nil against a total of 7,947,500 lbs. imported in the corresponding month of '36. Imports of flaxseed, however, were heavier, total reaching 1,139,000 bushels which compares with receipts of 885,660 bushels in January, '36.

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**Arc Welding Contest**

Details of the $200,000 Arc Welding Prize Contest of the James F. Lincoln Arc Welding Foundation are now available from the secretary at P. O. Box 5728, Cleveland. A total of 446 prizes are provided for papers in this contest.

## Orem Heads du Pont Heavy Chemical Sales

### Several Additional Personnel Changes Announced—Asplundh New Pittsburgh Plate Glass Director—Robinson on du Pont Board—Others in New Positions—

Edward A. Orem has been made sales manager of acids and heavy chemicals for the Grasselli Chemicals Department of du Pont, and his new headquarters are at Wilmington. He has been connected with the du Pont organization continuously since 1914 except during the World War period. From '24 to '29 he was the N. Y. branch sales manager for du Pont acids and heavy chemicals. When the two companies became affiliated he moved to the du Pont offices in the Empire State Building.

H. P. John, formerly eastern district sales manager for Grasselli, will also have Wilmington headquarters and will resume administrative duties in the sales department upon his return from a two months' vacation in Florida.

Edward Sterk, with Grasselli in the New York area for the past 28 years, specializing in agricultural insecticides and fungicides, has been made an assistant manager of that division, with offices at Wilmington. Edward Jones, who had been assisting Mr. Sterk, has been transferred to field work in the metropolitan N. Y. area; the office sales of insecticides having been assigned to Walter Shappa and Henry Wolf, who are also attached to the metropolitan N. Y. branch office, of which Edward J. Maguire is manager.

A. F. Yeager is the N. Y. district manager, in which capacity certain nearby branch offices are under his supervision. Ralph Buck is assistant to Mr. Yeager. Charles Boschen continues as export manager, with Emil Bull as assistant. Donald Woodford is in the local resale department, the main office of which is in Wilmington under the direction of E. H. Heil.

**Succeeds Pitcairn**

At the last directors' meeting of Pittsburgh Plate Glass held in N. Y. City on March 3rd, E. T. Asplundh, who has held the position of assistant to vice-president of Columbia Chemical Division of Pittsburgh Plate Glass, was elected as director to fill the place made vacant by the death of Edward Pitcairn. Mr. Asplundh makes his headquarters at Barberton.

**Robinson a du Pont Director**

E. G. Robinson, general manager of the organic chemicals department of du Pont, has been elected a member of the board of directors, to succeed the late John P. Laffey. Mr. Robinson became head of his department in '29 when he succeeded W. F. Harrington who had been elected a member of the executive committee.

**Schuler Goes to the Coast**

Ed. Schuler, assistant manager of the N. Y. office of Monsanto has been made manager of the company's Pacific Coast district office at San Francisco where he will have charge of the sale of products made by Monsanto and its affiliated companies, succeeding Charles L. Fetzner. Mr. Fetzner who has been at San Francisco for the past several years will undertake important duties at the main office in St. Louis.

**Hercules Reelects All Officers**

At the Hercules' board meeting on March 24th all officers and members of committees were reelected. The only addition was G. M. Norman as a member of the finance committee.

F. W. Rockwell has been elected vice-president in charge of production by National Lead directors. At the same meeting H. T. Warshow was elected a vice-president and placed in charge of accounts and corporate finance. Mr. Rockwell is the son of one of the founders of National Lead.

M. J. Creighton, general manager of the Zapon division of Atlas Powder, has been made a director of the company. He joined Atlas in '15.

Robert C. Stark, in charge of Pratt & Lambert's manufacturing operations, has been made a director. T. Emerson Murphy, assistant secretary and manager of Buffalo sales, has also been elected to the board.

Harlan W. How has rejoined Struthers Wells-Titusville Corp. as technical director. Company makes a wide line of equipment for the chemical and process fields. Mr. How was formerly chief engineer for Buffalo Foundry & Machine, and lately a Blaw Knox consultant.

Charles F. Rohleder, prominent in the industrial finishing field for several years, has been appointed chief chemist of Maas & Waldstein Co., Newark, N. J.

Benton A. Bull has resigned from du Pont to accept a position as a patent solicitor for Ames, Thiess, Olson & Mecklenburger, Chicago.

Harold deRopp has resigned from American Potash & Chemical and is now with the du Pont ammonia division at Charleston, W. Va.

Albert L. Galusha, widely known inventor of the Galusha Clean Gas Generator, has become associated with Wellman Engineering, Cleveland, as chief engineer of its recently acquired line of Galusha gas equipment.

E. D. Bolinger, a recent N. Y. U. Ph.D., is now with Fiberloid, Indian Orchard, Mass.

Wayne R. Fuller, formerly with Pratt & Lambert, is now with Peaslee-Gaulbert Paint & Varnish, Louisville.

Louis M. Larson, researcher for International Printing Ink, has been transferred to Chicago to establish a new ink development laboratory.

Joseph R. Lorenz, coatings specialist, is now with Hart Leather Finish, Chicago, in charge of production and research.

W. H. Lycan has resigned from the dyestuff section of du Pont to do work at Mellon for Pittsburgh Plate Glass.

Charles K. Novotny is back in Akron on the Firestone research staff after two years at the Liberia plantations of the company.

W. O. Stauffer has been transferred from the du Pont Experimental Station to do research work for Remington Arms at Bridgeport, Conn.

William F. Talbot, formerly with Gustavus J. Esselen, Inc., Boston, is now with Dennison Manufacturing, Framingham, Mass.

Edward J. Gleason, Jr., who has been operating his own business for several years, has joined the sales staff of Joseph Turner & Co.

Robert M. Fraser has been appointed manager of Southern Cotton Oil at Florence, S. C.

C. Fred Humburg, active in the drug and chemical field for the past quarter of a century, has joined the sales organization of Gerard J. Danco, Inc., N. Y. City distributor of aromatics, chemicals and drugs.

J. Gerstley and F. Lesser, directors of Borax Consolidated, Ltd., London, have been appointed joint manufacturing directors. The position was made vacant on Jan. 12th by the death of Richard Charles Baker, organizer of the company.

Richard Katz, Jr., has joined the eastern sales staff of Beck, Koller with headquarters at Elizabeth, N. J. At various times he has been with National Aniline, Calco, and Kentucky Color & Chemical.

Harry S. Fitzsimmons, for many years on the Grasselli sales service staff, has been transferred to the Krebs Pigment research group at Newport, Del.

D. H. Forbes, development engineer of Armstrong Cork, has resigned and is going abroad for several months.

Gus Burkemper, manager of the St. Louis office of the Grasselli Chemicals Department of du Pont, and affiliated with Grasselli for the past 31 years, has been transferred to Chicago where he will be branch manager.

**Galliher, Leppart Move**

W. Irving Galliher, director of sales for Columbia Alkali, and John C. Leppart are now located at the Barberton, Ohio, offices of the company. They formerly made their headquarters in the N. Y. City offices at Rockefeller Plaza.

**Battelle Appointments**

Three new appointments to the Battelle Memorial Institute staff have been announced. Frank Day will be assigned to a project in chemical engineering; E. J. Ramaley will research on the magnetic properties of alloys; and Howard L. Womochel has been assigned to the metallurgical division.

**Welch in New Post**

Continental Carbon announces the appointment of Don. M. Welch of Akron, Ohio, as rubber chemist in the laboratories of its plant at Sunray, Tex.

**Baty With Penn Salt**

Penn Salt Manufacturing announces the appointment of J. Bernard Baty, well-known sanitary engineer and chemist, as technician and consumer consultant in the technical service department. Mr. Baty left the post of assistant sanitary engineer of the N. J. Department of Health to accept his present appointment.

**Schmidt Joins Lotte Chemical**

Alfred E. Schmidt has joined Lotte Chemical, Paterson, N. J., chemical distributors. He was formerly with National Oil & Supply and previous to that with Mutual Chemical Co. of America.

## Tin and Copper Salts Hit New Highs

### Copper Sulfate at $6.00—Tin Quota Increased—March Chemical Tonnages Slightly Below Expectations—Texas House Votes Higher Sulfur Tax—

Soaring metal prices were largely responsible for most of the price changes last month. Highly spectacular was the rise in tin to levels unknown since the tariff boom days of '27. The U. S. Government has taken official recognition of this situation and Ambassador Bingham was reported to have had a "talk" with British Foreign Secretary Eden last month in which he is said to have indicated how adversely the rise in tin and rubber is affecting American industry.

The International Tin Committee on March 5th fixed the tin export quota at 100% of standard. A few days later the quota was raised to 110% and prices dipped sharply momentarily amid great excitement, only to move higher again as American buyers reentered the market.

Copper prices have been steadily rising and on March 30th reached 17c. As a result copper sulfate was advanced to $6.00 per 100 lbs. and spot stocks are nearly unobtainable. Several of the other important copper derivatives were quoted higher. Prices on both black and red copper oxide are nominal at the moment.

**Important Price Changes**

ADVANCED

| | Mar. 31 | Feb. 27 |
|---|---|---|
| Acid Abietic | $0.09¾ | $0.06¾ |
| Ammoniac, sal | 5.50 | 5.00 |
| Antimony needle | .16 | .15½ |
| Barium carbonate (nat.) | 44.00 | 42.00 |
| Copper sulfate | 6.00 | 5.35 |
| Lead acetate | .13½ | .11½ |
| Lead arsenate | .11½ | .10½ |
| Sodium alginate | .69 | .64 |
| Antimoniate | .15¾ | .15¾ |
| Stannate | .41 | .37 |
| Tin crystals | .45½ | .41½ |
| Tetrachloride | .32 | .28½ |
| Zinc carbonate, tech. | .14 | .12 |
| Zinc sulfate | 3.15 | 2.65 |

Activity in most of the chemical consuming industries was very satisfactory last month and the outlook, barring new labor troubles, is extremely promising. *The American Glass Review* reports that April may possibly bring a record April output and that factories are hard put to catch up on delayed shipments. Canadian newsprint output was up 25% in the first two months over the same period of last year. Steel mill activity, above 90%, is at record levels. With building and remodeling plans at a high point the paint industry is preparing for its busiest season

in 7 years. Textile and tanning factories are operating in many instances at close to capacity. Rayon plants in particular are being taxed to the limit.

Within the past 30 or 60 days most of the chemical producers have inaugurated higher wage schedules. It is rather unlikely that these will be reflected immediately in higher chemical prices, for, generally speaking, labor costs are not as an important factor in the chemical field as they are in other industries. Nevertheless, with raw materials rising also, there are many who feel that several price increases will be made in the second quarter.

**Strikes Effect Demand**

March tonnages of industrial chemicals were slightly disappointing. Traditionally the month is one of the best from the shipping viewpoint, but the wave of sit-down strikes forced industrial buyers into a cautious mood. Hence most orders were of the immediate shipment variety and were relatively small in volume. However, because of the high rate of operating activity in many consuming industries March '37 volume exceeded that of the corresponding period of '36 by a rather wide margin.

**Texas and Sulfur**

The Texas legislature is again tinkering with the sulfur tax. After sharp debate the lower house raised the rate from $1.02 per ton to $1.28. The opinion is expressed, however, that the upper house will slash this to $1.15.

**Strength in Chlorine**

Chlorine not many years ago was one of the "weak sisters" in the chemical price structure. The product is a classic example of the state of flux that the chemical industry is in. For several years now an extremely firm market has prevailed and last month there were announced plans for two additional units, one by Mathieson to be located either at Saltville, Va., or Lake Charles, La., and the other by Columbia at Barberton, Ohio. Expanding uses for chlorine have not only taken up the former slack but have created a mild shortage. Producers in increasing productive capacity are anticipating still further demands from the textile, paper and metallurgical lines as well as in sanitation.

**'36 Sulfur Statistics**

U. S. Sulfur production in '36 amounted to 2,015,231 long tons, a gain of 23% over the 1,632,590 tons produced in '35, according to Robert H. Ridgway and A. W. Mitchell of the Bureau of Mines. Shipments increased from 1,634,990 tons, valued at about $29,300,000 in '35 to 1,967,713 tons, valued at about $35,400,000 in '36. The 3,100,000 tons of sulfur at the mines on Dec. 31, '35 remained unchanged at the close of '36. Production of sulfur was reported from California, Louisiana, Texas, and Utah.

Texas increased its production 37% in '36 with an output of 1,723,292 long tons compared with 1,253,814 tons in '35. Shipments increased to 1,630,719 tons in '36, a gain of 20% over 1,354,101 tons shipped in '35. The properties that contributed to the production in '36 were those of Duval Texas Sulphur at Boling Dome, Boling, Wharton County; Freeport Sulphur at Hoskins Mound, Freeport, Brazoria County; and Texas Gulf Sulphur at Long Point Dome, Long Point, Ft. Bend County; Big Hill Dome, Gulf, Matagorda County, and at Boling Dome, Newgulf, Wharton County.

Output in Louisiana decreased from 373,283 long tons in '35 to 288,099 tons in '36. Shipments, however, increased from 275,747 tons in '35 to 333,475 tons in '36. As in '35, Freeport Sulphur and Jefferson Lake Oil were the producers.

Production in California and Utah amounted to 3,840 long tons in '36. Combined production for these two states in '35 was 5,493 tons. The Bureau of Mines is not at liberty to publish figures for California and Utah separately.

Imports of 530 long tons of ore were recorded by the Bureau of Foreign and Domestic Commerce in '36 compared with 1,763 tons in '35. Chile supplied all ore received in '36 and in '35.

Exports of sulfur or brimstone in '36 totaled 547,200 long tons compared with 402,383 tons in '35, an increase of 36%. Important quantities of American sulfur were exported to the following countries in '36: Canada received 155,700 tons in '36 compared with 119,554 tons in '35; United Kingdom, 79,004 tons compared with 56,252 tons; France, 73,660 tons compared with 45,455 tons; Australia, 57,536 tons compared with 46,348 tons; and Germany, 42,534 tons compared with 42,839 tons. Exports of crushed, ground, refined, sublimed, and flowers of sulfur in '36 were 44,142,524 lbs., an increase of 81% over the 24,352,269 lbs. exported in '35. The principal importing countries were Greece with 10,163,268 lbs.; Russia, 6,615,540 lbs.; Canada, 5,915,048 lbs.; United Kingdom, 5,260,347 lbs.; Australia, 2,723,626 lbs.; Mexico, 1,846,463 lbs.; and Germany, 1,431,017 lbs.

**Columbia Opens Office at Cleveland**

Columbia Alkali has opened a new office at Cleveland with A. E. Shaw as District Sales Manager of Northern Ohio, at 3849 Hamilton ave. Mr. Shaw joined

the Columbia organization in 1932. During the past few years he has devoted considerable time to promotion of calcium chloride and more recently to the sale of Columbia's full line.

## Bloede Dies in His 88th Year

### Widow of Late Senator T. Coleman du Pont Succumbs After Long Illness—Walter A. Kochs Suddenly Stricken—Other Obituaries—

Victor G. Bloede, 88, for more than 50 years a manufacturing chemist and philanthropist, died March 27th at his home in Catonsville, near Baltimore. Until a few weeks ago Mr. Bloede was active as the head of the ink manufacturing company which bears his name.

Mr. Bloede, whose father was a jurist and physician forced to flee Germany because of the old militarist régime, interested himself at an early age in chemistry, studying under Peter Cooper in New York. In 1867, at the age of 18, he was granted his first patent—for dextrin, gum derived from starch.

On the proceeds of his first patent Mr. Bloede established dye plants in Ohio and West Virginia. When floods destroyed these plants many years ago Mr. Bloede came to Baltimore.

He endowed the first of many philanthropies when he built the Marie Bloede Memorial Hospital at the Eudowood Sanitarium. This was the first hospital in Maryland for the care of advanced cases of tuberculosis.

Mr. Bloede is survived by his widow, a son, Carl, and three daughters, Mrs. William W. Woolcloth, Mrs. Peter B. Kelly and Miss Ilse Bloede.

**Mrs. Alice du Pont**

Mrs. Alice du Pont, 74, widow of the late Senator T. Coleman du Pont, died March 19th at her estate near Wilmington after a long illness. She was known for her many philanthropies, as a national leader of the Y. W. C. A., and as an authority on gardening.

**Walter A. Kochs**

As we go to press we learn of the sudden death of Walter A. Kochs, secretary, Victor Chemical Works, and the only son of August Kochs, president of the company. He was born in 1896. He married Frances Kennedy in 1918. He is survived also by two daughters.

**Other Deaths of the Month**

William S. Brimijoin, 57, Hercules Powder's safety engineer, died on March 23rd after an illness of several weeks.

Frank Hada, 26, prominent young du Pont chemist, died suddenly in Wilmington on March 8th.

William Makemson, 67, widely known chemist in the Birmingham area, died on March 11th. He was connected with the Southern Testing Laboratories, Atlanta.

Edward J. Horn, 56, a director of the A. C. Horn Co., Long Island City paint and varnish concern, died of a heart ailment at Miami.

J. G. Bates, 76, prominent southern textile chemist, died at Atlanta following a three weeks' illness.

Frank C. Hitchcock, 60, a Merck chemist, died on March 14th of a heart condition.

T. V. Blodgett, 46, sales manager, Lebanon Steel, died suddenly on March 28th. His death followed an operation for appendicitis. He was a Lehigh graduate and was with Bethlehem Steel for several years.

## Witco Carbon Becomes Continental Carbon

### Wage Increases Feature Plant News—C. K. Williams Wins Important Contract Suit—Other News of the Companies—

Robert I. Wishnick reports that in order to avoid confusion and conflict in names the corporate name of the newly organized Witco Carbon Co. has been changed to Continental Carbon Co. This is a change in name only and in no way affects the personnel, officers or directors, all of whom remain as previously announced.

Additional units of the plant at Sunray, Tex., are in production and supplying a carbon black of closely controlled quality.

Because of the increasing consumption the company is pushing forward construction on the final units of its plant vigorously and it is expected to be operating at full capacity soon.

**Hercules, du Pont, Wage Raises**

Wage boosts continue to be "news" from a number of the country's outstanding chemical manufacturing centers. Last month Hercules announced a 5c an hour raise for 800 at the Sayreville, N. J., plant, a total annual payroll increase of about $76,000. Du Pont department heads have received instructions from Wilmington that wage rates are to be adjusted upward to meet local conditions in the various units of the organization. Those meriting increases in the lower monthly salary brackets will also receive adjustments.

The company will distribute bonuses totalling $7,122,770 to employees and officers. Bonus was accumulated during '36 and will be distributed as follows: employees will receive $2,510,893 for meritorious service; an amount of $298,021 for conspicuous service of a specific nature, and the sum of $4,313,856 in merit awards to employees in managerial posts. Last year's total bonus was $4,764,433.

Standard Oil of Ohio has just granted wage increases totalling $300,000 annually on the basis of a 5% increase for salaried employees and a 10c an hour increase for hourly workers.

**C. K. Williams & Co. the Winner**

The application of the Federal Declaratory Judgments Act (passed June 14, '34) to the solution of industrial disputes is illustrated in the findings and conclusions filed by Judge George H. Moore in the U. S. District Court in St. Louis, Mo., on Feb. 12, in the suit of C. K. Williams & Co. v. National Pigments & Chemical.

Suit involved a dispute over the terms of two patent license contracts granting the C. K. Williams & Co. and its subsidiaries, Geo. S. Mepham Corp. and C. K. Williams & Co. of California, Ltd., the right to sell iron oxide and bentonite for the control of mud fluids in the drilling of oil and gas wells under the Stroud Patent No. 1,575,944 and the Harth Patent No. 1,991,637.

When the controversy arose, National Pigments & Chemical, who owned the patents, declared the licenses forfeited and attempted to cancel the contracts, and C. K. Williams & Co. brought suit under the Declaratory Judgments Act to have the contracts judicially interpreted.

The District Court found for C. K. Williams & Co. on all points and declared the contracts to be valid and subsisting licenses and that the attempt to cancel the contracts was improper.

Nelson Littell of N. Y. City, and George M. Rassieur of St. Louis, Mo., were attorneys for C. K. Williams & Co. and John H. Bruninga of St. Louis, Mo., was attorney for National Pigments & Chemical.

**Freeport Seeks New Home**

Negotiations are progressing for the purchase by Freeport Sulphur of the Sulphurdale sulfur mine from the Utah Sulphur Industries at Sulphurdale, Utah, according to Langbourne M. Williams, Jr., president of the former company. No estimate was made by Mr. Williams of the probable recoverable tonnage of the deposit.

**Carbide's Retirement Plan**

Retirement annuities for all employees of Carbide and its subsidiaries are provided in a plan that will be presented to the annual shareholders' meeting on April 20th. It is intended to supplement the annuities provided by the Social Security Act, especially for employees who receive more than $3,000 a year.

The letter to the shareholders announcing the plan estimated that its total cost for both past service and future service would be approximately $1,500,000 in the first year.

**News of the Companies**

Southern Dyestuffs has announced wage increases for its employees and a plan for building a plant addition which will increase its capacity by one-third.

Devoe & Raynolds has purchased an employee pension plan from Aetna Life Insurance which has been specifically designed to supplement benefits provided under the Social Security Act.

Pittsburgh Plate Glass and Corning Glass have formed a new corporation, to be known as the Pittsburgh-Corning Corp., to deal exclusively with the development, manufacture and sale of certain types of glass for the architectural and building fields.

Miner-Edgar plant at Sutton, W. Va., is up for sale and bids will be opened on April 14th.

Butler Feldspar, Spruce Pine, N. C., with a capital of $100,000 is a new feldspar producer.

A. D. Stuek, well-known in the industrial chemical field for many years, is handling a general line of chemicals through the Monmouth Chemical Co., 15 Whitehall st., N. Y. City.

The St. Louis, Rocky Mountain and Pacific Co. will reopen its activated carbon plant at Raton, N. M., closed since April, '35.

Chicago Copper & Chemical, Blue Island, Ill., had a $25,000 fire on Feb. 27th.

J. T. Baker Chemical's field men, numbering 20, attended a 3-day conference recently at the Hotel Easton, Easton, Pa., with General Sales Manager R. A. Clark presiding.

Commercial Solvents is adding 4 new steel tank barges, with a capacity of 200,000 gals., to its present fleet of 4 barges with like capacity.

Hopewell plant officials of Solvay Process were silent over rumors that a nitrate shipment for Spain would be made on the S. S. Linaria, British freighter.

Frederick Kenney has withdrawn from the consulting firm of Kenney-Herstein, Inc., N. Y. City, and the business will be conducted under the name of Herstein Laboratories, Inc., 18 E. 41st st.

Southern Extract, Lonsdale, Tenn., has just installed a $75,000 steam generating plant.

Osceola Turpentine, Holopaw, Fla., is a new naval stores producer.

The Si-Lux Co., Pittsburgh, has acquired the J. H. R. Products Co., Willoughby, Ohio, industrial chemical manufacturer, and will operate under the Si-Lux designation.

Hardesty Co., maker of stearic acid, oils, etc., may not locate its proposed

western plant in Orange county, California, because of unfavorable freight rates.

Plant of the Great Lakes Chemical Co., Manistee, Mich., new producer of bromine, is nearing completion.

Jefferson Lake Oil's new sulfur producing plant near Old Brazoria, Tex., is now ready for actual operation. About 250 will be employed.

Taylor Salt & Chemical, Norfolk, Va., has opened new branches at 1101 Ford st., Chattanooga, and Joshua st., High Point, N. C.

J. C. Miller Co., Grand Rapids, Mich., has just completed new research laboratories.

Four hundred workers at the Barr Chemical plant in Philadelphia won last month their 4-day strike for a closed shop agreement and a 5c per hour wage increase.

The Ansbacher-Alton Chemical Co.'s plant at Sodus, N. Y., was burned on March 17th with a $25,000 loss. Company is prepared, however, to make shipments without delay.

Wood Flour's plant at Manchester, N. H., was destroyed by fire on March 26th with a loss of $40,000. One man was reported missing.

### Address Changes Last Month

Several important changes of address were announced last month. Most important was the report that Harmon Color Works of Brooklyn will move to much larger quarters at Haledon, N. J. N. Y. Quinine & Chemical's St. Louis office is now in a leased 3-story building at 913 Market st. The Swan-Finch Oil Corp's headquarters are now at 30 Rockefeller plaza, N. Y. City, another addition to that rapidly growing N. Y. chemical center. The San Francisco office of General Dyestuff is at 37 Cleementina st.

### New Fine Chemical Producer

Clemmensen Chemical is a new producer of certain fine chemicals the exact nature of which has not as yet been disclosed. Company is headed up by Dr. Erik Clemmensen, one of the founders of the Commonwealth Chemical Corp., which later became the Commonwealth Chemical Division of Mathieson Alkali and still later passed into the hands of Monsanto. Company headquarters will be located at Newark, N. Y.

**Last month's article, "C. D. Alcohol," concludes its history with the modified 5-A and 10, leaving for some future historian the new formulas—11, 12, 13—which became effective at the beginning of the fiscal year 1936-37 and are now the only ones available. To bring the record down to date:**

**Formula No. 11 contains Pontol-K (a modification of Pontol) and ST-115 (a modification of Tecsol).**

**Formula No. 12 contains Pontol-K and Methyl Isobutyl Ketone;**

**Formula No. 13 contains ST-115 and Methyl Isobutyl Ketone.**

**Each formula prescribes in addition a petroleum marker; the denaturant content ranges from 7½—9 parts of denaturants per 100 parts of ethyl alcohol.**

### Southern Sulfate Pulp

Union Bag & Paper has made an initial shipment of 4,200 tons of sulfate pulp made from Georgia pine to its northern mills.

### New Sulfur Producer

Sulphur Diggers, Inc., with Los Angeles headquarters and deposits at Zurich, Inyo county, California, is a new sulfur producer. Sidney B. Wood is president, and W. N. Wilkinson, for many years sales manager of Union Sulphur, is general manager. Company headquarters are at 3923 W. 6th st., Los Angeles.

## Crude Naphthalene Declines 15¢

### Tight Situation in Cresylic Continues—Firm Prices Prevail for Refined Naphthalene—Coking Operations Continue to Increase—

Coal-tar markets in March were very active. The features were a 15c reduction in crude naphthalene, caused by freer offerings of imported material, and a sharp advance in high boiling cresylic. Stocks of this acid are almost unobtainable on spot. The rise over the past year in this commodity has been forced by a combination of circumstances, the most important being the cessation by Germany of the export of over a million pounds annually. Additional factors have been the widening use in industry, particularly in the resin field. There is some talk in England of placing an embargo on cresylic to safe-guard home supplies, but such a move would very likely meet with serious opposition. Several years ago an embargo was placed on pitch but it was soon removed for it was discovered that once export markets are lost they are difficult to revive.

Despite generally prevailing cold weather, the demand for refined naphthalene has been brisk and the price structure has held up remarkably well. Some recession in shipments of the coal-tar solvents has been reported, reflecting the labor situation in the automotive areas. With the possibility of a settlement of the Chrysler strike now brighter, producers of solvents anticipate better volume in April. Intermediate prices have held up remarkably well, although there has been some slackening in the demand of late from the dye producers. This hesitancy has been the result more of fear of possible labor trouble in the textile field, rather than any decline in current textile production schedules. Particular firmness is reported in phthalic anhydride and spot stocks are difficult to obtain. The schedule on orthodichlorbenzene was "upped" 1c in the middle of the month.

**Important Price Changes**

| | Mar. 31 | Feb. 27 |
|---|---|---|
| **ADVANCED** | | |
| Orthodichlorbenzene | $0.06 | $0.05 |
| **DECLINED** | | |
| Naphthalene, crude | $2.65 | $2.80 |

### 7 Months of Increases

For 7 consecutive months coke production has advanced over the preceding month, February, daily rate of 154,728 tons being the highest on record since that of November, '29. Compared with January '37, February rate rose 2.5%. Output of byproduct coke for the 28 days of February was 3,991,481 tons, or 142,553 tons per day, an increase of 1.4% when compared with January recovery. Continued activity at blast furnaces resulted in a gain of 3.4% in the daily production of pig iron. Responding to this activity, coke production at furnace plants rose 2.4%, while at merchant plants the rate declined 1.5%. During the month two companies put into blast new batteries of ovens, a total of 167 ovens being added to the active list.

There was a decided decrease in the volume of stocks on hand at byproduct plants at the end of the month. Compared with January stocks, those for February showed a drop of 14.7%, bulk of which occurred at merchant plants.

## Fine Chemicals

### ¶ Glycerine Slightly Easier—Tartaric Higher—Cadmium Metal Scarce—

The shortage of glycerine of the past few months appears to be over and while stocks are still small producers are again taking contracts. It is still quite difficult to obtain sizable spot stocks. Soap-lye quotations were down 5c per pound and saponification grade 6c per pound.

**Important Price Changes**

| | Mar. 31 | Feb. 27 |
|---|---|---|
| **ADVANCED** | | |
| Acid tartaric | $0.22¾ | $0.21¾ |
| Agar No. 1 | 1.05 | .95 |
| Cadmium metal | 1.20 | 1.05 |
| Corn syrup, 42° | 3.91 | 3.76 |
| 43° | 3.95 | 3.86 |
| Cream of tartar | .15¾ | .15 |
| Manganese glycerophosphate | 2.61 | 2.60 |
| Zinc oxide, U.S.P. | .09 | .08 |
| **DECLINED** | | |
| Bismuth subnitrate | $1.13 | $1.30 |
| Subcarbonate | 1.23 | 1.40 |
| Subgallate | 1.33 | 1.50 |
| Calcium glycerophosphate | 1.00 | 1.05 |
| Glycerin, soaplye | .22 | .27 |
| Saponification | .23 | .29 |
| Menthol | 3.25 | 3.30 |
| Santonin | 25.00 | 30.00 |
| Sodium glycerophosphate | 1.00 | 1.15 |

Tartaric acid was advanced 1c late in the month and the trade is wondering

# MERRIMAC CHEMICAL COMPANY

## manufactures industrial chemicals -

[redacted]

SULFURIC ACID, ACETIC ACID, CHLORIDE OF ALUMINA, BISULFATE OF SODA, ANHYDROUS SODIUM SULFATE, GLAUBERS SALT, MERCLOR (Sodium Hypochlorite), AMMONIA, COPPERAS NITRATE OF IRON, ALCOHOL, LACQUERS, SOLVENTS, MURIATIC ACID.

[redacted]

AMMONIA ALUM, SODIUM BISULFITE, SODIUM SULFIDE, LACQUERS, SOLVENTS, MERTANOL (a Syntan), SULFATE OF ALUMINA IRON FREE, SULFURIC ACID.

[redacted]

SULFATE OF ALUMINA COMMERCIAL AND IRON FREE, SODIUM ALUMINATE, SALT CAKE, LACQUERS.

[redacted]

SULFATE OF ALUMINA, SODIUM ALUMINATE, FERRISUL (Anhydrous Ferric Sulphate), MERCLOR (Sodium Hypochlorite).

*Specifications and prices on these and other Merrimac products for diversified industrial requirements will be gladly furnished on request.*

*Manufactured by*

**MERRIMAC CHEMICAL COMPANY**

EVERETT STATION BOSTON, MASS.

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378 St. Paul St., West, MONTREAL

# CHEMICAL

## *The Photographic Record*

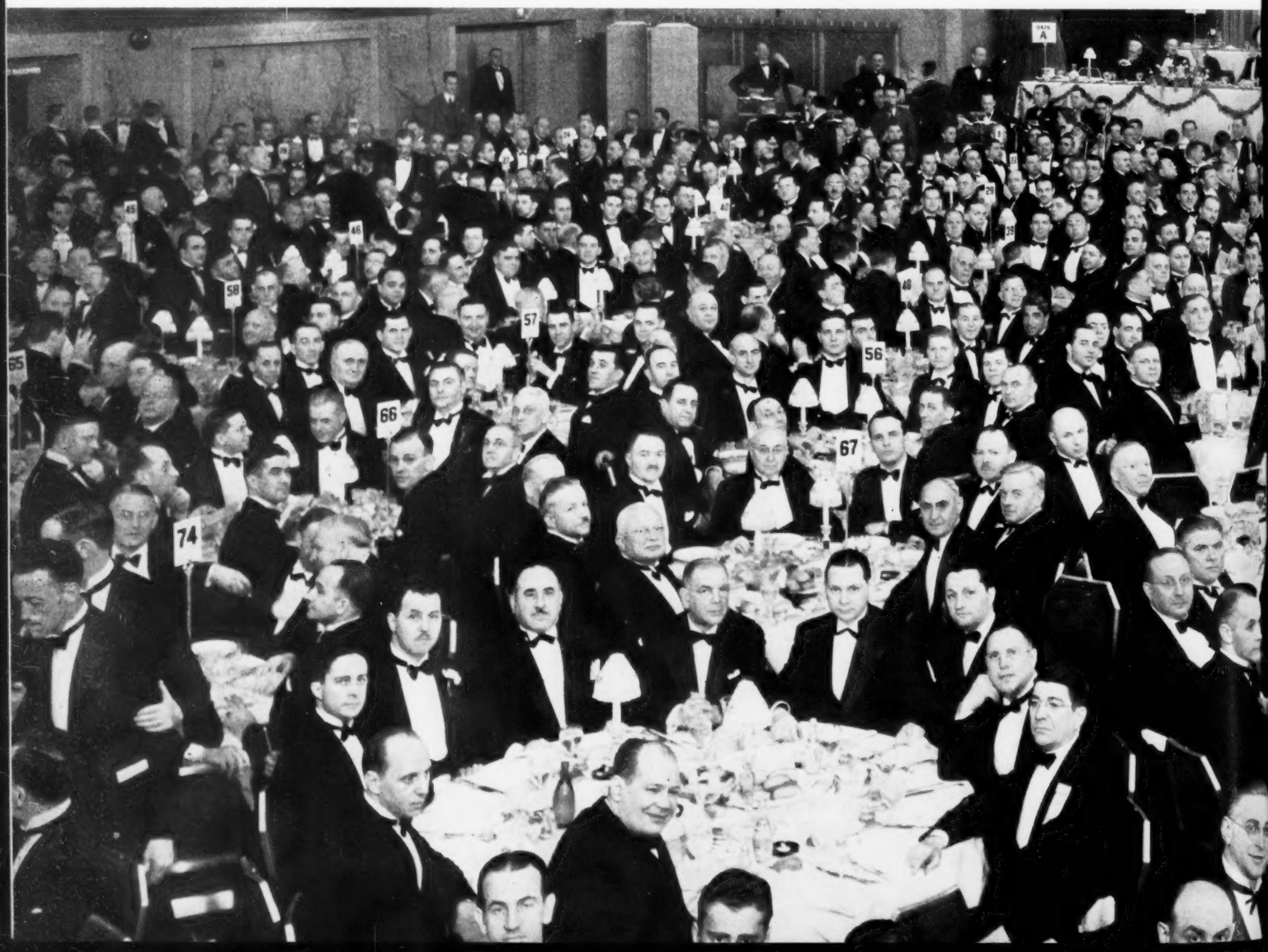
*"Junior" Graph-Air Gun took bronze award, transparent cellulose containers.*

**Winners in the 1936 All America Package Competition.**

*S. C. Johnson & Sons' new line of enamels won Silver Award for metal containers.*

*Louis Neuberg (Westvaco Chlorine) above, left, with Russell Hoblitzell, at Miami, just after their boat had come in with four fine sailfish and several other smaller fish.*

*Below and opposite, twelfth annual dinner of the Drug, Chemical and Allied Trades Section, New York Board of Trade, held last month at the Waldor*



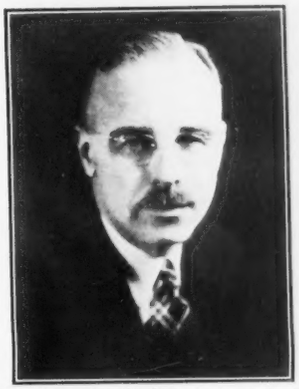
# NEWS REEL

## *of Our Chemical Activities*

*Corning Glass and Pittsburgh Plate Glass form new corporation to be called Pittsburgh-Corning Corp. Left, Harry S. Wherrett, president of new company, also president, Pittsburgh Plate Glass.*

*Right, Amory F. Houghton, president, Corning Glass, chairman of the board of the new company.*

*Use of Gravelite saved more than thirty million pounds in weight of San Francisco Bay bridge. This new aggregate is light enough to float in water as shown above, and is made by burning particles of clay and shale in such manner as to cause them to expand into a light weight material of unusual strength.*



*Stephen L. Tyler, new executive secretary of the American Institute of Chemical Engineers.*

# THE SHORT-CUT TO BAGPAKING TAKES YOU INTO VERY GOOD COMPANY

HOW the progressives in the chemical field have taken to these near-human cost-and-time-saving machines is almost hard to believe.

They find that the adoption of the multi-wall Paper Bag with the superior reinforced Bagpak Cushion Stitch is making their products lower-priced, better-packaged, better-looking—better-selling. The facts await you.

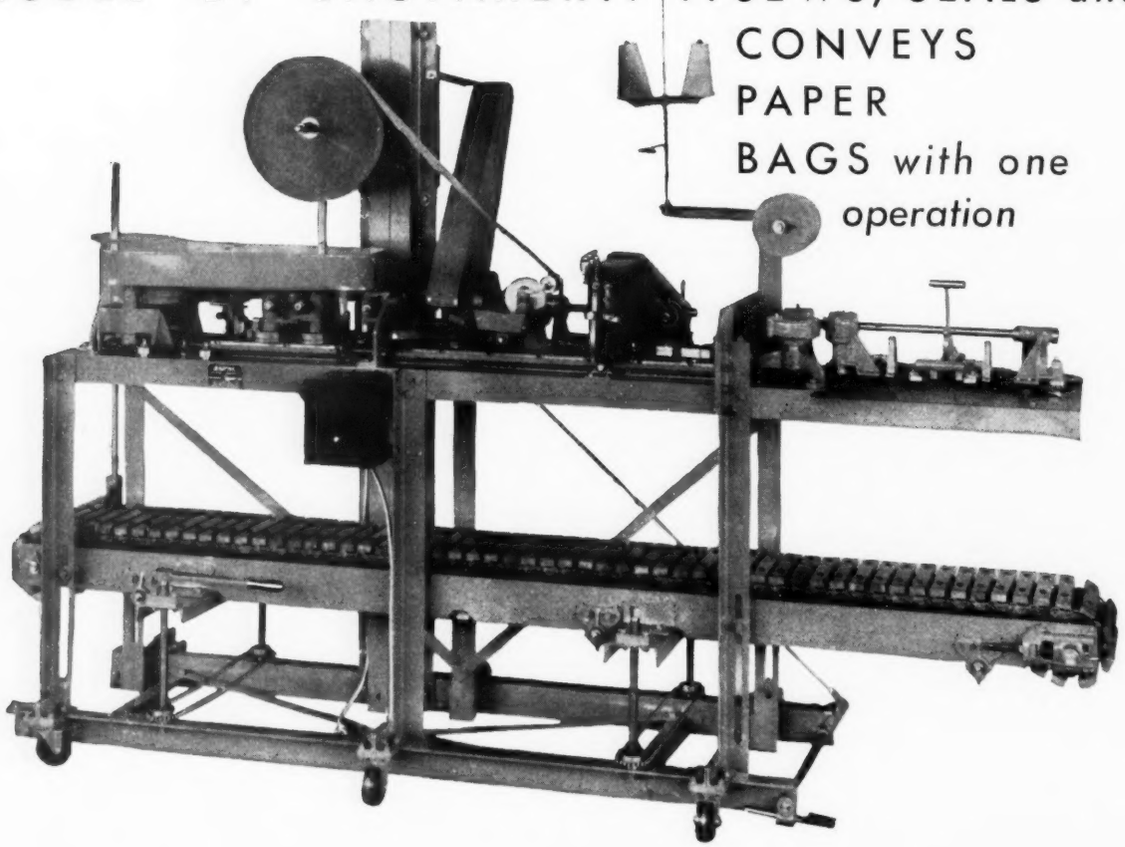
*A few who have recently taken the short cut*

Anaconda Copper Mining Co.
Mathieson Alkali Works
Mutual Chemical Company of America
Solvay Process Co.
Names on request of other chemical manufacturers who are using Bagpakers for their products.

THE IDEAL ONE-MAN PACKAGE
Paper bags are easy to handle

**BAGPAK INC**
**220 East 42nd Street, New York City**

MODEL "D1" BAGPAKER . . . . SEWS, SEALS *and* CONVEYS PAPER BAGS *with one operation*



whether this will result in higher prices for cream of tartar, Rochelle Salt, and Seidlitz mixture. Earlier in the month a 1c increase was reported on tartaric, making a net gain of 2c in the 30-day period. Cream of tartar was advanced ¾c at that time.

Cadmium metal is scarce. In fact it may be said that the shortage is quite acute. A 15c advance was made last month but even at the $1.20 level supplies are difficult to obtain. Increasing consumption is the cause of the present situation. Sales in '35 jumped to 4,023,900 pounds from a '32 depression low of 1,154,414 pounds.

Bismuth quotations are firm, but some weakness developed in a few of the salts, the direct result of competition between makers. Japanese agar was advanced sharply last month in the face of extremely small spot stocks. Mercury and mercurials are very firm. This condition is quite likely to continue for some time as the deadlock in the Spanish civil war seems to be unbroken. Citric acid prices are firm with the close approach of the active season. Present quotations are the lowest on record. Italy appears to be no longer an important factor, at least for the present. The Italian shortage has been so great that some 70 tons of fermentation acid have been imported recently. Shipments of citric from Hawaii to the U. S. in '36 totalled 697,833 pounds, as against 845,710 pounds in the previous year.

## Paint Raw Materials Advanced Sharply

### Higher Metal Prices Force Rises in Pigments—Strong Gum Market—Naval Stores React—Higher Paint Prices Expected—

Paint makers were faced last month with an avalanche of higher raw material costs and those who had contracted ahead for their requirements were congratulating themselves on their farsightedness. Rapidly advancing prices in most of the metals was the order of the day. Several separate advances in pig lead forced sharply higher quotations on all lead pigments. Even a slight recession near the end of the month provided little comfort for the paint manufacturers for another upward turn in the market is generally anticipated. Zinc prices have also been moving up steadily and oxide prices were advanced ¾c-1¾c.

Prices for many earth colors were increased April 1st, including Indian red, domestic yellow ochre, Persian Gulf oxide, burnt siennas, metallic brown, and Venetian red. Bone black quotations were raised 1c, the first advance in a long time. The sharp rise in pig lead was responsible for a 1c advance in chrome green, and 2½c in chrome yellow. Lead titanate was another lead derivative substantially advanced on April 1st. A new and higher schedule for aluminum bronze powders and pastes has been placed in effect. Tricresyl phosphate was advanced 2c. Casein continued weak last month and suffered a ½c reduction. With a seasonal increase in domestic production the decline is quite understandable.

Cables from abroad indicate quite clearly that replacement costs on the Congo gums will be much higher, and as a result importers placed new schedules in effect immediately on several items. Kauri was advanced, the first change in this commodity in several months. About the only raw materials of any importance in the paint field to show declines in March were rosin and turpentine. A corrective reaction in the naval stores markets has been anticipated for several weeks and finally did occur.

**Important Price Changes**

| | Mar. 31 | Feb. 27 |
|---|---|---|
| **ADVANCED** | | |
| Black bone | $0.16 | $0.15 |
| Chrome, green | .21 | .20 |
| Yellow | .15½ | .14 |
| Lead, red | .0945 | .09½ |
| White carbonate | .09 | .08½ |
| Sulfate | .08¾ | .07¾ |
| Litharge | .0845 | .08½ |
| Orange mineral | .12¾ | .12½ |
| Tricresyl phosphate | .24½ | .22½ |
| Zinc oxide | .06 | .05¼ |
| **DECLINED** | | |
| Casein | $0.17 | $0.18 |

Strong feeling exists that a general price rise in carbon black prices may be made about the middle of the year. Despite the entrance of new manufacturers and greatly increased productive capacity, the improvement in the consuming industry has been such as to prevent any accumulations.

**Price Advance April 1st?**

With raw material costs mounting rapidly there exists strong belief among the paint manufacturers that another and still sharper rise in paint prices must be made. It was reported that several producers were preparing higher schedules to be released April 1st, but as this is written the large companies with national distribution have given no clues as to what policy they will follow.

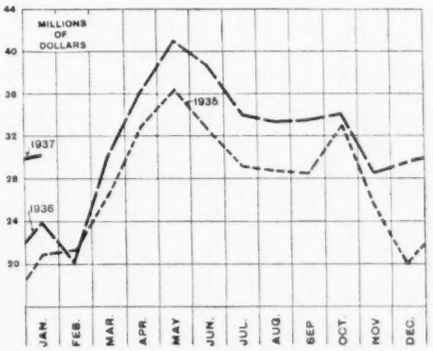
A further substantial rise in residential construction is expected. With rents advancing it is also expected that renovations and alterations will increase. Paint producers have their fingers crossed and are fervently hoping that the coming spring season will be the best since '29. January paint, varnish, lacquer, and filler sales, reported by 680 establishments to the Bureau of the Census, totalled $31,288,615, as against but $24,149,799 in January of last year.

A gain of more than 20% was shown in construction during January as contrasted with the figures for December, '36, according to data from F. W. Dodge Corp. The January, '37 total likewise was some 13% better than the figure for January, '36. For the 37 eastern states covering all classes of construction, the total amounted to $242,844,000 in January, '37 and compares with $199,695,700 for December, '36 and $214,792,800 for January, '36.

Construction work started in February showed a total about one-third greater than was reported in February, 1936, according to figures from F. W. Dodge Corp. Reporting on the February results this agency indicated a total of $188,590,800 for February in the 37 eastern states as compared with $140,419,100 for February of last year and $242,844,000 for January of this year. For the initial two months of 1937 figures amounted to $431,434,800 a gain of about 22% over the corresponding two-month total of $355,211,900 for '36.

**Lacquer Sales Unsatisfactory**

Lacquer manufacturers have suffered because of the labor situation in the automotive field. If the C.I.O. and Chrysler can reach an agreement by the first of April output may soar to practical capacity of the industry. Production will not reach, however, the record volume of 664,000 units produced in April '29. A tremendous backlog exists for sales have been good. February total of 363,930 vehicles represents a sizable increase over the 287,606 units sold in February of '36, but a slight decline from the 379,843 marketed in January of this year.



*Paint Makers Start Year With a Gain*

**Site for '37 Convention**

Cincinnati has been selected for the '37 convention of the National Paint, Varnish, Lacquer Association, the date is Oct. 27-29th, and the hotel is the Netherland Plaza. The convention will be preceded by the convention of the Federation of Paint & Varnish Production Clubs, which is scheduled to open Oct. 25th, and the annual Paint Show will be an added attraction.

## Textile, Tanning Industries Continue Active

### Purchasing of Chemicals Satisfactory—Expect Record Year in Rayon Production—Corn Derivatives Advanced—Rayon Technicians to Meet May 14th—

Although purchasing agents in the textile and tanning fields continued to adhere quite closely to a short-term buying policy on most items the volume of shipments of chemical specialties, chemicals, dyes and tanstuffs to these industries was quite satisfactory from the suppliers' viewpoint.

The Bureau of the Census reports that there were 24,090,204 cotton spinning spindles operated in February, compared with 24,364,802 in January and 23,347,850 in February of '36. According to reliable trade forecasters, the daily average rate of cotton consumption by domestic mills will probably set a new record in '37, unless strikes cause protracted interruptions of production. The total use for February of 664,439 bales was the largest for any February. Reports indicate that mills operated at a high rate during March.

The rayon producers are finding it difficult to keep up with commitments. The industry is in the midst of the greatest expansion program in its history. Leading companies are increasing capacity by 20-50%. Production last year was up 7% over '35, while consumption gained 15%.

Silk appears slated for better things. Prices have advanced rather sensationally, but part of this movement at least must be attributed to speculative influence. Nevertheless, with consumer purchasing power expanding as higer wage rates go into effect in most industrial lines, the demand for silk goods is bound to improve.

January shoe production totalled 36,674,179 pairs as against 33,355,004 in January of last year and 33,380,528 in December. In many quarters earlier opinions are being revised, and forecasts are now made that despite the record production of '36 the current year's total will again top previous totals. Shoe producers report that current increases in sale volume average about 15%.

Relatively few price changes in textile and tanning chemicals were reported last month. Starch, dextrin, corn sugar and other corn derivatives were advanced when corn shot higher. A sharp rise was made in egg products when higher quotations were made at the primary market for April-May shipments. Zinc dust quotations moved up with the market for the metal. An irregular demand featured the market for synthetic dyes. Trading in most of the natural tanstuffs was fair, and price changes generally were within narrow limits. The firmness of the sulfonated oils continued, reflecting the generally firm position of most of the primary oils.

**Important Price Changes**

| | Mar. 31 | Feb. 27 |
|---|---|---|
| **ADVANCED** | | |
| Albumen, egg | $0.77 | $0.76 |
| Dextrin, corn | 4.70 | 4.00 |
| Starch, corn | 3.88 | 3.78 |
| Valonia cups | 32.50 | 32.00 |
| Wattle bark | 33.50 | 31.00 |
| Zinc dust | .0940 | .089 |
| **DECLINED** | | |
| Albumen, blood, dark | $0.11 | $0.12 |
| Myrobalans J1 | ..... | 20.75 |
| Valonia beards | 48.50 | 49.00 |

The National Rayon Technical Conference will be held in Washington, May 14 and 15th, under the co-sponsorship of the Textile Division and Washington Section of the American Society of Mechanical Engineers, American Association of Textile Chemists and Colorists, U. S. Institute of Textile Research, Committee D-13 of the American Society for Testing Materials. Purpose is to bring together members of all technical and scientific organizations connected with the textile industry for the discussion of the various problems of common interest involved in the manufacture and processing of rayon yarns and fabrics. Details are available from M. A. Golrick, Jr., 29 W. 39th st., N. Y. City.

## Heavier Solvent Shipments to Rubber Companies

### Acetone Firmer—Secondary Hexyl Alcohol Up 3c—Isopropyl Alcohol Reduced Sharply—

Movement of petroleum solvents in the Michigan area was restricted by the prevalence of strikes. Some of this slack, however, was taken up by improved conditions in the Akron rubber center. Tire manufacturers have maintained heavy production schedules in anticipation of spring replacement needs and a sudden demand from the automobile makers when the strike conditions are finally settled. It is believed that an early settlement will cause crude rubber consumption to remain at a record rate during the first half of '37. Rubber consumption in the first quarter is likely to exceed 150,000 tons which would be an increase of 15 to 20% over the same period of last year.

Trade circles believe that rubber consumption in March again was close to 50,000 tons. This would bring crude rubber consumption during the first quarter up to 149,000 tons, or 16.5% above the same period of last year. However, this rate of increase over last year probably will not be equaled during the second quarter.

The price structure for acetone is taking on a much firmer appearance. The relatively new petroleum acetone industry has added quite a sizable production to be absorbed, but the sharp rise in industrial activity has proved to be a decided help.

Ethyl alcohol production of 17,517,531 gallons in February was up 28% from the figure for the February total of a a year ago but 7% below the January volume. Ethyl alcohol in storage amounted to 19,820,937 gallons, as against 20,315,430 at the end of February '36 and 14,035,044 on Jan. 1st.

The Bureau of Internal Revenue has revoked special formulas 11, 26, 31(b), and 31(c). These have not been used for some time and this action is in line with the Bureau's determination to simplify the special formula structure. The technical committee of the Industrial Alcohol Institute met with Treasury officials on March 16th to discuss the next steps in the program.

**Important Price Changes**

| | Mar. 31 | Feb. 27 |
|---|---|---|
| **ADVANCED** | | |
| Alcohol, hexyl, secondary | $0.13 | $0.10 |
| **DECLINED** | | |
| Alcohol, isopropyl: | | |
| Ref. 91% | $0.39½ | $0.50 |
| 98% | .44½ | .60 |
| Tech., 91% | .35 | .45 |
| 98% | .39½ | .55 |

With the anti-freeze demand now completely over interest centered in consumption by industrial users which was reported as being excellent.

Higher prices (a 3c rise) were placed in effect for secondary hexyl alcohol. Sharp reductions, on the other hand, were announced for isopropyl alcohol as follows: 91% refined, 5½c; 98%, 10½c; 91% technical, 5c; 98% technical, 10½c. Despite unfavorable consumer conditions a good demand was reported for acetone, butyl and ethyl acetates, and butyl alcohol.

#### U. S. Proven Oil Reserves

Proven oil reserves of the U. S. on Jan. 1st, are estimated at 13,063,000,000 bbls., according to a report submitted to the board of directors of the American Petroleum Institute by the Institute's Committee on Petroleum Reserves. This is an increase of 886,000,000 bbls. over the estimate of these reserves as of Jan.

1, '35. During this two-year period the committee calculates that 2,044,000,000 bbls. were produced; but discoveries of new pools and development of old ones have covered this and added 886,000,000 bbls. to proved reserves.

Further, the committee says that its latest calculation of reserves is so conservative that it will probably have to be revised upward as further developments take place. That was what happened two years ago, when the estimate as of Jan. 1, '35, placed proven reserves at 12,177,000,000 bbls. Later the figure was raised to 13,632,000,000 when more complete data on new discoveries became available. Commenting on the report, President Axtell J. Byles, of the Institute, said the estimate must be understood to deal only with "known and proven" reserves.

## Expect Sale of 7,400,000 Tons of Fertilizer

### Some Rumors of Price Cutting in the Carolinas—Cyanamid, Sulfate at Higher Levels—February Tag Sales Up 38%—Heavier Superphosphate Production—

The fertilizer season, somewhat late in starting, is now in full swing, and generally speaking the outlook is quite favorable. It is expected that sales for the current year will reach 7,400,000 tons, which is quite a sizable increase from the depression low level of less than 3,000,000 tons in '31-'32. The price structure on mixed goods appears to be holding up extremely well, although some reports of price cutting in the Carolinas have been received. This appears to be a very localized condition. It is difficult to visualize serious price competition and price slashing this season with raw material prices constantly pointing higher. Indeed this situation has brought about an unusual condition of affairs where mixers are more than mildly interested in prices for next season. This would seem to indicate that many mixers are favorable to stocking substantial quantities ahead. Such a condition, however, would likely cause quite a little reselling.

The third advance this season in cyanamid (this one of 2½c a unit) was made last month. The synthetic nitrogen materials have received more than their usual attention this season and shipments of cyanamid have been very heavy. An improved demand for sulfate has more than offset the increase in production, the result of heavy steel production.* The downward trend in organic ammoniates, prevailing for the past 60 days, was reversed slightly last month and suppliers were firmer in their price views.

Trade in Chesapeake menhaden scrap futures has opened up 7 or 8 weeks ahead of the opening of last year and futures were booked at a dollar per unit higher than the opening price last year. A flurry has developed in late potash purchasing. From present indications the current season should be a record one for potashes. According to reliable reports, shipments of 20% superphosphate have been particularly heavy.

The rise in fertilizer tax tag sales which has been so pronounced during the present fiscal year continued in February. In the 17 reporting states, sales in February were 38% above last year, while July-February sales were 32% larger. Sales in each of the 12 southern states were larger in February this year than last with the exception of Mississippi.

**Important Price Changes**

**ADVANCED**

| | Mar. 31 | Feb. 27 |
|---|---|---|
| Blood, import. | $3.90 | $3.75 |
| N. Y. | 4.10 | 3.75 |
| Bone meal, 3 and 50, Chgo. | 21.00 | 20.00 |
| Cyanamid | 1.15 | 1.12½ |
| Hoof meal | 3.65 | 3.25 |
| Tankage, dom., Chgo. | 3.75 | 3.50 |
| N. Y. ungrd., N. Y. | 4.00 | 3.85 |

In each of the last 11 months superphosphate production has been larger than in the corresponding month of the preceding year. January production was the largest for any January in the last 7 years, and exceeded January '36 by 30%. There was a 29% increase in production in the July-January period, with output in the South rising 35% compared with a 21% gain in the Northern Area.

Trend of shipments in January was mixed, with the increase in total shipments the result of a large increase in shipments "to other acidulators." There were gains shown in all classes of shipments in the Southern Area. Some slackening in the increased direct use of superphosphate is indicated by the figures. The usual sharp rise in stocks of superphosphate in mixed goods, in anticipation of the spring peak in sales, occcurred in January.

### 4th Quarter Potash Deliveries

The American Potash Institute announces that potash deliveries within the continental U. S., Canada, Cuba, Puerto Rico and Hawaii during the fourth quarter of the calendar year '36 amounted to 162,636 tons of actual $K_2O$. This was equivalent to 293,269 tons of potash salts. These figures include salts of domestic and foreign origin, exclusive of importations of potassium nitrate.

For the calendar year, deliveries of $K_2O$ amounted to 368,988 tons, equivalent to 681,337 tons of potash salts. These figures relate to deliveries, not consumption, of potash salts.

### '35 Fertilizer Statistics

Manufacturers of fertilizers reported substantial increases in employment and production in '35 as compared with '33, according to preliminary figures compiled from the returns of the recent Biennial Census of Manufactures. The industry employed 17,473 wage earners in '35, an increase of 33.8% as compared with 13,063 reported for '33, and their wages, $10,967,021, exceeded the '33 figure, $7,274,317, by 50.8%. Aggregate production of fertilizers in '35 amounted to 6,476,565 tons, valued at $122,061,056 (at f. o. b. factory prices), representing increases of 24.6% in quantity and 47.4% in value as compared with 5,195,962 tons, valued at $82,810,953, reported for '33. Production of complete fertilizers (mixtures containing nitrogen, phosphoric acid, and potash) in '35 was 4,176,806 tons, as against 3,273,744 tons in '33. Complete figures on the industry are now obtainable from Director William L. Austin, Bureau of the Census, Department of Commerce, Washington.

### Fertilizer Notes

The State of Idaho has appointed a commission of 3 and has appropriated $25,000 to be devoted to aiding the development of the phosphate deposits in the southeastern counties of the state.

More than 950 tons of Chilean nitrate were destroyed in a fire that gutted the Danish ship *Laila* in Boston on March 10th.

## Construction

The outstanding construction news of the month was the announcement that Mathieson Alkali is maturing plans for the erection of a large chlorine plant at either Saltville, Va., or Lake Charles, La. It is said that there is a possibility that the company may also produce salt cake. With the erection of a large number of bleached kraft paper plants in the south a large increase in the demand for chlorine in the south is anticipated. With nearly all rayon manufacturers planning plant enlargements a big increase in caustic consumption in the south is also looked for.

It is also reported that Columbia Alkali will shortly increase the capacity of its new chlorine plant at Barberton, Ohio. It has been running at capacity since it was started in August of last year.

Southern Kraft, subsidiary of International Paper & Power, plans erection this year of a new mill in the south which will have a capacity of 220,000 tons of kraft board annually. This is in addition to the mill now being constructed at Georgetown, S. C., which will have a capacity of 200,000 tons of kraft board a year. The site of the new mill has not been announced.

* Sulfate was raised $2 on the Pacific Coast on April 2nd.

Started in September, 1935, the new Ponsol Building of the du Pont Dye Works at Deepwater will be completed early this fall, it was reported last month in the *Dyeworks News*, bi-weekly plant newspaper. Says the *News*:

"Occupying 5 acres of ground, 5 stories high and boasting of a total of 210,000 sq. ft. of floor space, this latest outpost in the ever-increasing girth of the Dye Works dominates the plant's skyline. Striking simplicity of its lines gives no hint of the complicated maze of equipment which constitutes its vitals.

"Designed to accommodate the transfer of the Carrollville, Wisconsin, plant to Deepwater, the building will produce 15% of all colors made in the Dye Works. From 200 to 300 men will be needed to operate it, dependent on whether it goes on a 5-day or a 7-day production schedule."

**New Ethyl Plant**

A new Ethyl fluid plant under construction at North Baton Rouge, La., is to be the first step in the decentralization of plants manufacturing ingredients for leaded gasoline, it is announced by the Ethyl Gasoline Corp. The plant, which is being built by du Pont, is expected to be ready to commence operations by next July, employing an operating personnel of 150 men. Paralleling the work of 4 production units at Deepwater, N. J., new facilities are planned for a production capacity equal to 20% of Ethyl's anticipated '37 business.

Later a second unit will be built at North Baton Rouge, enabling the company to supply demands for antiknock gasoline in the Southwest and on the Pacific Coast from the Louisiana plant, and effecting a substantial saving on shipping costs under existing rates.

Improvements developed during years of tetraethyl lead manufacture have been incorporated in the new set-up by du Pont engineers, it was said, and every provision has been made at the North Baton Rouge site for future growth.

**Columbia's New Laboratory**

Columbia Alkali has awarded a general contract to the Gilmore-Carmichael-Olson Co., Cleveland, for construction of a 2-story and basement brick and steel laboratory and office addition to its plant at Barberton, estimated to cost $100,000 or more.

**Ansul's Western Expansion**

Construction of Ansul Chemical's new plant near Modesto, Calif., is under way. Ward Snowden, manager, reports cost at $15,000 and that plans call for a total investment of $50,000.

**Semet-Solvay Gets Contract**

Semet-Solvay, has been awarded by the Great Lakes Steel Corp., of Detroit, a contract for a 130°-oven by-product coke plant. Project calls for the construction, on Zug Island on the Detroit River, of two batteries of Semet-Solvay vertical flue combination ovens. The by-product plant will include a benzol refining unit.

**Additional Construction News**

Rumor has it that the plant of the Grasselli Chemicals Division of du Pont at Toledo will be expanded shortly. Du Pont engineers are considering a site at Macon, Ga., for a new rayon plant. National Lead is said to be planning to double the capacity of the Sayreville, N. J., plant. Cyanamid has awarded a contract for a $200,000 addition at the Niagara Falls plant. Standard Oil of Louisiana will build a $2,750,000 lubricating plant at Baton Rouge. Pure Oil will double its Toledo refinery with an expenditure of $2,000,000. Gulf Oil also is planning to spend nearly $2,500,000 in expansion of its Toledo refineries. DuPont has started construction on a two-story addition to the du Pont Building in Wilmington. The addition will be the 7th section of the du Pont Building since the building was first begun in 1907. McGean Chemical is constructing 3 new buildings at its plant near Cleveland.

It is rumored that du Pont is contemplating the erection of a plant at Charleston, S. C., for the purpose of utilizing the by-products of paper-making plants located in the vicinity. Very little is known about the actual details of the process.

Cyanamid is building a new addition to its Bridgeville, Pa., plant.

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## Personal

Lord Leverhulme has been awarded the Osborne Reynolds Medal in recognition of his services as president of the first International Chemical and Engineering Congress last year. Dr. D. M. Newitt has received the Moulton Medal for his paper on "The Design of Vessels to Withstand High Internal Pressures."

Dr. Robert B. Sosman, physical chemist of the U. S. Steel Corp., is the new president of the American Ceramic Society. V. C. Kelsey, Consolidated Feldspar, is a vice-president of the Society. The next annual meeting will be held in New Orleans.

At the February meeting of the Plastics Group, Society of Chemical Industry, held in London, England, Robert J. Moore, Bakelite, was elected group representative for the American section.

E. A. Hults, Mathieson Alkali, and Andrew Fletcher, St. Joseph Lead, have been added to the board of trustees of the Air Hygiene Foundation, Pittsburgh.

Leo M. Christensen who is handling technical details of the experimental alcohol plant at Atchison, Kan., told the Kansas City Real Estate Board on March 26th about the use of alcohol as a motor fuel ingredient.

Harvey Gravell, president, American Chemical Paint, has contributed $1000 to be used in the development of the music department of Albright College, Reading, Pa.

Ralph E. Dorland, eastern Dow sales manager, was in Mexico recently.

John A. Chew, popular chemical broker, has sold his Scarsdale, N. Y., residence and will live in N. Y. City. He also owns a large estate in Virginia.

Dr. Ferdinand Sonneborn, president, L. Sonneborn Sons, is chairman, and Dr. Maximilian Toch of Toch Brothers and the Standard Varnish Works, is co-chairman of the joint campaign of the chemical, oil and paint trades, to raise funds for European Jews to settle in Palestine.

Robert Ames Norton of Cyanamid's patent department discussed existing and proposed laws affecting chemical patents on March 8th before 200 members of the North Jersey Section of the A. C. S.

Glenn L. Haskell, U. S. I. vice-president, is chairman of the chemical and paint division of the Commerce and Industry Committee which will solicit contributions for the Salvation Army during April.

Joseph W. Dunning, personnel director at Niagara Falls for the R. & H. Chemicals Department of du Pont, is chairman of the men's general division of the annual Community Chest campaign.

**On the Gangplank**

H. H. Rosenthal, president, H. H. Rosenthal & Co., distributors, brokers, importers and exporters of chemicals, oils, waxes, drugs and allied products, sailed April 7th in the *Washington* for a two months' trip through Europe. He is accompanied by Mrs. Rosenthal. While the trip is primarily for pleasure Mr. Rosenthal will interview a number of executives of companies his firm now represents in this country. According to tentative plans he will return late in May or early in June.

A. A. Teeter, Charles Pfizer & Co., sailed for a 7 week European trip on April 1st. He left in the *Bremen*. A well-known amateur photographer, he plans to take pictures in England, France, Switzerland and Italy.

E. R. Bridgwater, division manager, du Pont's rubber chemicals division, is in Europe on a combined pleasure and business trip. He plans to return early in April.

R. M. Reed, president, Western Dry Color, Chicago, accompanied by Mrs. Reed spent the month of March in the West Indies.

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Phillips Petroleum and United Carbon jointly will construct and operate a new carbon black plant in the Sunray field of Moore County, Tex.

# THIS PAIR NEVER LEFT THE MILL!

*Rust spots and holes in silk hose caused by flocculent material in the peroxide bath.*

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One of the soluble silicates in the P. Q. line may prove a short-cut or an improvement in some process in your plant. Let's discuss it.

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# Chemical Stock Values Declined Slightly in March

## Allied Earnings $25,323,834 for '36—Cyanamid Nets $1.77 a Share—Tennessee Corp. Proposes Capital Reduction—

Chemical stocks on the N. Y. Stock Exchange showed a net loss of $78,258,631 for the month. On March 1st the net value totalled $6,573,366,524 as against $6,495,107,893 on April 1st. The average price on March 1st was $80.41, as against $78.30 on April 1st. The loss on net value in February amounted to $76,111,698.

### Allied Earnings Near Record

Allied Chemical brought earnings last year back close to the best levels on record. Net profit was $25,323,834 or $11.44 a share on 2,214,099 shares of common against $21,701,275 equal after preferred dividends to $8.71 a share in 1935. Retirement of $39,284,900 preferred stock in 1936 effected a saving of $2,749,943 in dividends.

Previous best earnings of Allied were $26,962,442 or $11.12 a share in '28 and $30,198,523 or $12.60 a share in '29 on 2,401,329 shares.

President H. F. Atherton states in his report, that volume of business was the largest in company's history and that dollar sales were exceeded only in 1929. Initial unit of a plant at Hopewell, Va., for the manufacture of chlorine directly from salt, by a new process, he states, is now in commercial operation.

Marketable securities carried in the balance sheet under current assets, consisting of 224,000 shares of U. S. Steel and 270,000 shares of Air Reduction, with a cost value of $22,839,350 had a market value on Dec. 31, '36, of $38,532,000.

### Cyanamid Nets $1.77 a Share

The Cyanamid report including subsidiaries for year ended Dec. 31st, shows consolidated net profit of $4,454,930 after depreciation, depletion, interest, federal income taxes, provision of $52,050 for federal surtax on undistributed profits, minority interest and other charges, equivalent to $1.77 a share (par $10) on combined 2,520,368 shares of Class A and Class B common stock outstanding at end of the period, including shares reserved for stocks not yet presented for exchange, but excluding 157,674 shares of Class B stock held by subsidiaries. This compares with consolidated net profit in '35 of $4,062,160 or $1.61 a share on combined Class A and Class B common stocks.

With sales in '36 at the highest level in its history, and 18% over '35, Columbian Carbon came through with net income last year 33% higher than that for '35. Net profits were equal to $7.48 a common share against $5.56 a share for '35.

Sales continue to show an upward trend in the current year, reports H. H. Curtze, president. For January and February the increase is 20% over the corresponding months in 1936. A substantial increase in carbon black production is planned.

Report shows net profit of $4,021,137 after depreciation, depletion, interest, federal income taxes and provision for federal surtax on undistributed profits, etc., equivalent to $7.48 a share on 537,411 no-par shares of capital stock excluding 1,009 shares in treasury. This compares with $2,992,860 or $5.56 a share on 537,586 shares in '35.

### Additional Earnings Statements

Carbide for last year reported the largest earnings in its history, exceeding '35 about 35%. Net income last year was $36,852,208 equal to $4.09 a share on 9,000,743 shares against $27,254,248 or $3.02 a share in '35 and $35,427,024 in '29, the previous record year when net was equal to $3.93 a share on the present capital.

Air Reduction also reported record net for '36 of $7,064,553 or $2.79 a share on 2,532,065 shares, a gain of about 33% over the $5,292,866 or $2.09 a share on the present capital earned in '35. In '29 Air Reduction earned $5,972,996 or $2.58 a share on the present basis.

### Dividends and Dates

| Name | Div. | Stock Record | Payable |
|---|---|---|---|
| Air Reduction, ext. | 25c | Mar. 30 | Apr. 15 |
| Air Reduction, q | 25c | Mar. 30 | Apr. 15 |
| Am. Agr. Chem. | $1.00 | Mar. 15 | Mar. 31 |
| Am. Cyan., A & B, q | 15c | Mar. 15 | Apr. 1 |
| Am. Hard Rubber, pf., q | $2.00 | Mar. 16 | Mar. 31 |
| J. T. Baker Chem. | 25c | Mar. 24 | Apr. 1 |
| J. T. Baker Chem., pf., q | $1.37½ | Mar. 24 | Apr. 1 |
| Canadian Indust. | $1.50 | Mar. 31 | Apr. 15 |
| Canadian Indust., pf., q | $1.75 | Mar. 31 | Apr. 15 |
| Clorox Chemical, q | 75c | Mar. 15 | Mar. 25 |
| Colgate-Palmolive-Peet, q | 12½c | May 6 | June 1 |
| Colgate-Palmolive-Peet, pf., q | $1.50 | Mar. 5 | Apr. 1 |
| Devoe & Raynolds, A & B, q | 75c | Mar. 20 | Apr. 1 |
| Devoe & Raynolds, pf., q | $1.75 | Mar. 20 | Apr. 1 |
| du Pont, deb., q | $1.50 | Apr. 9 | Apr. 24 |
| Freeport Sulphur, 6% pf. | $1.50 | Apr. 15 | May 1 |
| General Paint, pf., q | 67c | Mar. 23 | Apr. 1 |
| General Printing Ink | 60c | Mar. 17 | Apr. 1 |
| General Printing Ink, pf., q | $1.50 | Mar. 17 | Apr. 1 |
| Glidden Co., q | 50c | Mar. 17 | Apr. 1 |
| Glidden Co., pf., q | 56¼c | Mar. 17 | Apr. 1 |
| Great Western Electro. Chem., pf., q | 30c | Mar. 20 | Apr. 1 |
| Heyden Chemical, pf., q | $1.75 | Mar. 22 | Apr. 1 |
| Int. Nickel | 50c | Mar. 1 | Mar. 31 |
| Int. Nickel, pf., q | $1.75 | Apr. 1 | May 1 |
| Int. Printing Ink, q | 50c | Apr. 20 | May 1 |
| Int. Printing Ink, pf., q | $1.50 | Apr. 20 | May 1 |
| Int. Salt Co., q | 37½c | Mar. 15 | Apr. 1 |
| Koppers, 6%, pf., q | $1.50 | Mar. 12 | Apr. 1 |
| Mathieson Alkali, q | 37½c | Mar. 5 | Mar. 31 |
| Mathieson Alkali, pf., q | $1.75 | Mar. 5 | Mar. 31 |
| Merck & Co. | 25c | Mar. 19 | Apr. 1 |
| Merck & Co., pf., q | $1.50 | Mar. 19 | Apr. 1 |
| Nat. Lead, q | 12½c | Mar. 12 | Mar. 31 |
| Nat. Lead, B, pf., q | $1.50 | Apr. 16 | May 1 |
| Nat. Oil Prod. | 30c | Mar. 19 | Mar. 31 |
| Newport Industries | 50c | Mar. 20 | Apr. 5 |
| Pittsburgh Plate Glass | $1.00 | Mar. 10 | Apr. 1 |
| Pratt & Lambert | 50c | Mar. 15 | Apr. 1 |
| P. & G., 8% pf., q | $2.00 | Mar. 25 | Apr. 15 |
| Spencer Kellogg, q | 40c | Mar. 15 | Mar. 31 |
| Union Carbide | 80c | Mar. 9 | Apr. 1 |
| United Carbon, q | $1.00 | Mar. 15 | Apr. 1 |
| United Dyewood, q | 25c | Mar. 10 | Apr. 1 |
| United Dyewood, pf., q | $1.75 | Mar. 10 | Apr. 1 |
| Westvaco Chlorine, pf., q | 37½c | Apr. 10 | May 1 |
| Young, J. S. & Co., q | $1.50 | Mar. 19 | Apr. 1 |
| Young, J. S. & Co., pf., q | $1.75 | Mar. 19 | Apr. 1 |

Heyden Chemical reports for a net profit of $555,540, equal to $3.56 a common share, against $504,831, or $3.22 a share, in '35.

The statement of Pittsburgh Plate Glass and subsidaries showed a net profit for '36 of $15,321,834 after depreciation, depletion, Federal and State income taxes, Federal surtax on undistributed earnings and other charges. Profit was equal to $7.15 a share on 2,142,443 shares of $25 par capital stock, excluding shares in the treasury.

In '35, company reported a net profit of $11,398,739, or $5.32 each on 2,142,353 shares then outstanding.

U S. I. and subsidaries report for 1936 a net loss of $77,581 contrasting with net earnings in 1935 of $843,742. Charles S. Munson, president, explained in report to stockholders that the difference in non-operating income of $274,640 in 1935 was due to profits derived from sale of se-

### Price Trend of Chemical Company Stocks

| | Feb. 26 | Mar. 5 | Mar. 12 | Mar. 19 | Mar. 25 | Mar. 31 | Net Gain or loss last month | Price on Mar. 31, 1936 | 1937 High | 1937 Low |
|---|---|---|---|---|---|---|---|---|---|---|
| Air Reduction | 73⅞ | 74½ | 76 | 73 | 72¾ | 73¼ | — ⅝ | 185⅞† | 80¼ | 71¼ |
| Allied Chemical | 233 | 250 | 250 | 240 | 243 | 245 | +12 | 199½ | 258½ | 225 |
| Columbian Carbon | 115½ | 116 | 112½ | ..... | ..... | 125 | + 9½ | 112½ | 125½ | 112¼ |
| Com. Solvents | 18⅜ | 19¾ | 18¾ | 19 | 18⅜ | 18⅜ | ..... | 20⅞ | 21¼ | 18 |
| du Pont | 170½ | 176½ | 171 | 164½ | 161 | 159½ | —11 | 144¼ | 180⅛ | 156 |
| Hercules Powder | ..... | 172 | ..... | 170 | ..... | ..... | ..... | 102 | 185 | 150½ |
| Mathieson Alkali | ..... | 38¼ | 39¾ | 37½ | 37⅜ | 37½ | ..... | 32⅛ | 41¾ | 36 |
| Monsanto Chemical | 93 | 93½ | 92½ | 91 | 90¼ | 92½ | — 1½ | 101 | 101 | 89 |
| Std. of N. J. | 72⅛ | 74⅝ | 73¾ | 71⅛ | 70¼ | 72⅛ | ..... | 64⅞ | 76 | 67¾ |
| Texas Gulf Sulphur | 41⅛ | 40⅜ | 39½ | 39½ | 39¾ | 42½ | + ⅜ | 34¼ | 44 | 38½ |
| Union Carbide | 106 | 109⅜ | 108 | 106 | 105 | 104 | — 2 | 81½ | 111 | 101½ |
| U. S. Ind. Alcohol | 39¾ | 39¼ | 38⅞ | 40⅛ | 39¼ | 40⅝ | + ⅞ | 48⅛ | 43⅝ | 37½ |

† Stock before split up.

# CRESYLIC ACID

CASEIN

Dibutyl Phthalate
Diethyl Phthalate
Dimethyl Phthalate
Triacetin

AMERICAN-BRITISH
CHEMICAL SUPPLIES, Inc.
180 MADISON AVE., NEW YORK

# ACETATE SALTS

**Aluminum Acetate**
***20% Solution***

**Aluminum Acetate Basic**
***32% Solution***

**Ammonium Acetate**

**Chrome Acetate**

**Copper Acetate**

**Ferric Acetate Powder**
***Normal or Basic***

**Iron Liquor**
**(*Ferrous Acetate Solution*)**

**Manganese Acetate**

**Potassium Acetate**

**Sodium Acetate, Tech.. 60%**

**Sodium Acetate, Special, 90%**

**Sodium Acetate, Anhydrous**

**Sodium Diacetate**

**Zinc Acetate**

***Samples and further information on request***

NIACET
CHEMICALS CORPORATION
Sales Office and Plant ❖ Niagara Falls, N. Y.

curities, and a difference of $240,000 in favor of 1936 due to the decrease in the provision for renewals and replacements charged to operations during that year.

Report of American Commercial Alcohol and wholly-owned subsidaries for year ended Dec. 31st, shows profit of $1,187,232, before provision of $300,000 adjustments of reserve for estimated profits on sales of bulk whiskey subject to deferred delivery, and after provision for doubtful accounts, interest, depreciation, Federal income taxes, etc., equivalent to $4.55 a share (par $20) on 260,934 shares of common stock outstanding. After deducting $300,000 adjustment of reserve for estimated profits on sales of bulk whiskey subject to deferred delivery, net profit carried to earned surplus was $887,232 or $3.40 a common share.

For year 1935 profit before deducting $620,000 provision for estimated unrealized profit on sales subject to deferred delivery, was $823,412, equal to $3.15 a common share. After deducting $620,000 provision for estimated unrealized profit on sales, net profit was $203,412, or 78% a common share.

### Earnings Statements Summarized

| Company: | Annual dividends | Net income 1936 | Net income 1935 | Common share earnings 1936 | Common share earnings 1935 | Surplus after dividends 1936 | Surplus after dividends 1935 |
|---|---|---|---|---|---|---|---|
| **Allied Chemical & Dye:** | | | | | | | |
| Year, December 31 | $6.00 | $25,323,834 | $21,701,275 | *h*$11.44 | *h*$8.71 | $12,039,240 | $5,997,901 |
| **American Cyanamid:** | | | | | | | |
| Year, December 31 | §.60 | 4,454,930 | 4,062,160 | *c*1.77 | *c*1.61 | 1,934,562 | 2,927,994 |
| **American Hard Rubber:** | | | | | | | |
| Year, December 31 | *w*1.00 | 283,288 | 145,727 | 1.55 | *p*6.42 | ..... | ..... |
| **American Zinc, Lead & Smelting:** | | | | | | | |
| December 31 quarter | *f* .... | 93,420 | †60,909 | *p*1.24 | .... | ..... | ..... |
| Year, December 31 | *f*.... | 52,336 | †219,150 | *p*.69 | .... | ..... | ..... |
| **Barnsdall Oil Co.:** | | | | | | | |
| Year, December 31 | *k*.80 | 2,262,544 | 741,136 | *h*1.00 | *h*.34 | 493,467 | 316,378 |
| **Bon Ami:** | | | | | | | |
| Year, December 31 | *y*.62½ | 1,221,676 | 1,003,089 | *b*3.38 | *b*2.87 | ..... | ..... |
| **Callahan Zinc-Lead:** | | | | | | | |
| Year, December 31 | *f*.... | †68,704 | ..... | .... | .... | ..... | ..... |
| **Celanese Corp.:** | | | | | | | |
| Year, December 31 | *k*1.50 | 4,406,993 | 4,057,227 | 2.25 | 1.99 | 903,432 | 2,216,248 |
| **Chickasha Cotton Oil:** | | | | | | | |
| Six months, December 31 | .... | 73,049 | 214,190 | .28 | .84 | ..... | ..... |
| **Climax Molybdenum:** | | | | | | | |
| Year, December 31 | *k*1.00 | 5,206,111 | 3,227,767 | 2.06 | 1.28 | 2,686,111 | 1,484,767 |
| **Colgate-Palmolive-Peet:** | | | | | | | |
| *n* Year, December 31 | *k*.75 | 4,218,955 | 4,141,721 | 1.40 | 1.36 | ..... | ..... |
| **Columbian Carbon:** | | | | | | | |
| Year, December 31 | *k*5.75 | 4,021,137 | 2,992,860 | 8.48 | 5.56 | 936,939 | 635,950 |
| **Commercial Solvents:** | | | | | | | |
| Year, December 31 | *k*.80 | 2,232,135 | 2,702,092 | .84 | 1.02 | 122,689 | 461,321 |
| **Compressed Industrial Gases:** | | | | | | | |
| Year, December 31 | §2.00 | 355,823 | 290,818 | .... | .... | ..... | ..... |
| **Dominion Tar & Chemical:** | | | | | | | |
| Year, December 31 | *f*.... | 384,166 | 243,563 | *p*7.27 | *p*4.44 | ..... | ..... |
| **Duval Texas Sulphur:** | | | | | | | |
| Year, December 31 | *w*.50 | 306,246 | 78,223 | ..... | ..... | ..... | ..... |
| **General Printing Ink:** | | | | | | | |
| Year, December 31 | *k*5.00 | 1,177,803 | 924,059 | 5.28 | 3.88 | 51,957 | 346,717 |
| **Heyden Chemical:** | | | | | | | |
| Year, December 31 | *w*.50 | 555,540 | 504,831 | 3.56 | 3.22 | ..... | ..... |
| **Lindsay Light & Chemical:** | | | | | | | |
| Year, December 31 | *f*.... | 26,809 | 52,089 | .18 | .63 | ..... | ..... |
| **Mead Corp.:** | | | | | | | |
| Year, December 31 | *f*.... | 955,020 | 501,607 | *h*1.22 | *h*.51 | ..... | ..... |
| **Merck:** | | | | | | | |
| Year, December 31 | *k*.90 | 1,048,222 | 931,565 | 2.57 | 1.77 | ..... | ..... |
| **National Lead:** | | | | | | | |
| Year, December 31 | *k*1.00 | 7,232,530 | 5,261,390 | 1.71 | 1.07 | 2,211,107 | 1,479,559 |
| **Newport Industries:** | | | | | | | |
| Year, December 31 | *k*.60 | 507,009 | 295,117 | .98 | .57 | 195,401 | 295,117 |
| **Penick & Ford:** | | | | | | | |
| Year, December 31 | *k*3.75 | 1,301,927 | 1,052,960 | 3.52 | 2.85 | *d*85,573 | *d*57,040 |
| **Staley, A. E., Mfg.:** | | | | | | | |
| Year, December 31 | 5.00 | 1,460,568 | 299,200 | 26.44 | *p*5.98 | ..... | ..... |
| **Standard of Ohio:** | | | | | | | |
| Year, December 31 | 5.00 | 4,194,314 | 2,690,647 | 4.76 | 2.77 | 2,086,834 | 2,090,647 |
| **Tubize Chatillon:** | | | | | | | |
| Year, December 31 | *f*.... | 1,047,006 | 578,552 | *a*6.45 | *a*2.99 | ..... | ..... |
| **Vanadium Corp.:** | | | | | | | |
| Year, December 31 | *f*.... | 152,193 | †425,791 | .40 | .... | ..... | ..... |
| **Vulcan Detinning:** | | | | | | | |
| Year, December 31 | *k*8.00 | 321,424 | 311,318 | 6.66 | 6.26 | ..... | ..... |

*h* On shares outstanding at respective periods; § Plus extras; *c* On combined Class A and Class B shares; *w* Last dividend declared; *p* On preferred stock; *f* No common dividend; † Net loss; *k* Paid in year 1936; *y* Last dividend declared on Class B stock, period not announced; *b* On Class B stock; *d* Deficit; *a* On Class A shares.

### Annual Reports Analyzed

| Company: | Fixed chgs. times earn. | Pfd. div. times earned | Cash and mark. securities | Inventories | Ratio-cur. assets to cur. liab. | Working capital |
|---|---|---|---|---|---|---|
| **Columbian Carbon:** | | | | | | |
| Year, Dec. 31, 1936 | No fd. dbt. | No pfd. | $4,143,562 | $1,717,892 | 4.9 | $5,964,987 |
| Year, Dec. 31, 1935 | No fd. dbt. | No pfd. | 3,339,047 | 1,906,799 | 6.2 | 5,769,226 |
| **Commercial Solvents:** | | | | | | |
| Year, Dec. 31, 1936 | No fd. dbt. | No pfd. | †3,386,684 | 7,338,212 | 7.2 | 12,122,177 |
| Year, Dec. 31, 1935 | No fd. dbt. | No pfd. | †3,292,243 | 7,322,919 | 9.2 | 12,937,039 |
| **Corn Products Refining:** | | | | | | |
| Year, Dec. 31, 1936 | No fd. dbt. | 6.68 | 36,738,859 | 11,163,483 | 6.3 | 44,604,627 |
| Year, Dec. 31, 1935 | No fd. dbt. | 4.86 | 36,047,333 | 7,823,610 | 7.0 | 43,190,885 |
| **General Printing Ink:** | | | | | | |
| Year, Dec. 31, 1936 | No fd. dbt. | 5.72 | 1,098,192 | 1,732,686 | 5.2 | 3,571,478 |
| Year, Dec. 31, 1935 | No fd. dbt. | 4.41 | 1,290,154 | 1,644,016 | 7.0 | 3,677,853 |
| **National Lead Co.:** | | | | | | |
| Year, Dec. 31, 1936 | No fd. dbt. | 3.75 | ‡12,497,874 | 20,781,131 | 5.2 | 34,434,555 |
| Year, Dec. 31, 1935 | No fd. dbt. | 2.73 | ‡11,428,139 | 20,038,590 | 7.8 | 34,563,783 |
| **Penick & Ford, Ltd.:** | | | | | | |
| Year, Dec. 31, 1936 | No fd. dbt. | No pfd. | 3,288,590 | 2,501,189 | 9.0 | 5,789,117 |
| Year, Dec. 31, 1935 | No fd. dbt. | No pfd. | 3,537,071 | 1,923,882 | 7.7 | 5,474,622 |
| **United Carbon Co.:** | | | | | | |
| Year, Dec. 31, 1936 | No fd. dbt. | No pfd. | †854,172 | 486,711 | 3.02 | 1,840,170 |
| Year, Dec. 31, 1935 | No fd. dbt. | No pfd. | †766,043 | 704,324 | 2.77 | 1,679,869 |

† Cash only; ‡ Securities carried at market value.

### Tennessee Stock Reduction

Notice has been received by the Stock Exchange from the Tennessee Corp. of a proposed reduction in the authorized capital stock from 1,058,535 shares to 862,067 shares, and an increase by the number of shares necessary to meet conversion of proposed convertible debentures.

### Rustless Iron Offering

Public offering of 25,000 shares of $2.50 cumulative convertible preferred stock without par value of Rustless Iron & Steel, Baltimore, was made last month by W. E. Hutton & Co. at $51 per share.

A. E. Staley Manufacturing has filed a registration statement with the SEC covering 75,000 shares $5 cumulative preferred stock, no par, and 570,000 shares common stock, $10 par.

Company will offer 50,000 shares of the preferred share for share in exchange for its 7% preferred ($100 par) and will pay $1,778 on each share exchanged to adjust the difference in dividend rates to April 30, 1937.

Balance of the preferred shares being registered, together with any shares not taken under the exchange offer, and 149,980 shares of common, are to be offered to common stockholders pro rata. Price to shareholders will be filed by amendment.

### Dividend Changes

Pittsburgh Plate Glass has declared a $1 dividend which compares with $2 on Dec. 21st, $1.50 on Oct. 1st, and 50c on July 1st, '36. Newport Industries has authorized 50c as against an initial payment of 60c on Dec. 15th. Harshaw voted a 30c dividend on the common, payable March 20th and 1¾% quarterly dividend payable March 31st.

### Wall Street Gossip

Wall Street gossip has it that Allied has sold since the first of the year about 10% of its holdings of 224,000 shares of U. S. Steel. Fertilizer stocks were generally strong last month despite general weakness in the market. It was reported that there was strong institutional buying in V.-C. for long pull purposes. With A. A. C. becoming such an important factor in industrial chemicals traders do not know whether to classify it as a fertilizer or a chemical stock.

**OTHER EASTMAN CHEMICALS**

•

Hydroquinone

Silver Nitrate

Gallic Acid

Nitrocellulose Products

Research Organic Chemicals

•

# PYROGALLIC ACID, *C. P.*

**UNIFORM — PURE — FRESHLY MADE**

**THESE three properties offer the purchaser of Eastman Pyrogallic Acid, C. P., a quality suitable for the most exacting work. Continuous production, meeting the stringent requirements of a photographic developer, assures prompt shipment from fresh stocks.**

***Further information and quotations will be furnished on request. Eastman Kodak Company, Chemical Sales Division, Rochester, N. Y.***

**EASTMAN TESTED CHEMICALS**

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## Church & Dwight, Inc.

*Established 1846*

70 PINE STREET NEW YORK

Bicarbonate of Soda

Sal Soda

Monohydrate of Soda

*Standard Quality*

# Chemical Stocks and Bonds

| Mar. Last | 1937 High | 1937 Low | 1936 High | 1936 Low | 1935 High | 1935 Low | Sales | Stocks | Par $ | Shares Listed | Dividends* | Earnings** $-per share-$ 1936 | Earnings** $-per share-$ 1935 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Number of shares | | | | | | |
| **NEW YORK STOCK EXCHANGE** | | | | | | | Mar. 1937 | 1937 | | | | | |
| 73¼ | 80¼ | 71½ | 86½ | 58 | 57½ | 35 | 26,500 | 64,900 | Air Reduction | No | 2,523,065 | $2.50 | 2.79 | 2.10 |
| 245 | 258½ | 225 | 245 | 157 | 173 | 125 | 24,400 | 45,900 | Allied Chem. & Dye | No | 2,214,099 | 6.00 | 11.44 | 8.71 |
| 95 | 101½ | 83 | 89 | 49 | 57¾ | 41½ | 10,300 | 27,500 | Amer. Agric. Chem. | No | 210,934 | 2.50 | 4.71 | 6.37 |
| 29⅞ | 30¾ | 26⅜ | 35⅜ | 20½ | 35¾ | 22½ | 34,400 | 81,600 | Amer. Com. Alcohol | 20 | 260,947 | .50 | 4.55 | 3.16 |
| 43½ | 46 | 41 | 50 | 37 | 52 | 36 | 3,900 | 18,600 | Archer-Dan-Midland | No | 549,546 | 3.00 | 3.20 | 3.46 |
| 83 | 94 | 72¼ | 84 | 48 | 48½ | 32¾ | 6,800 | 13,000 | Atlas Powder Co. | No | 248,660 | 3.50 | 4.21 | 2.81 |
| 126 | 133 | 125 | 131 | 112 | 115 | 106¾ | 230 | 1,030 | 5% conv. cum. pfd. | 100 | 88,781 | 5.00 | 20.86 | 16.93 |
| 33⅜ | 36⅜ | 26⅝ | 32¼ | 21¾ | 35⅜ | 19½ | 114,200 | 563,700 | Celanese Corp. Amer. | No | 1,000,000 | 1.50 | 2.25 | 1.99 |
| 108½ | 113½ | 106½ | 116 | 106 | 111¼ | 97½ | 1,600 | 5,000 | prior pfd. | 100 | 164,818 | 7.00 | 27.25 | 35.34 |
| 24⅝ | 25¾ | 18⅛ | 21¼ | 13 | 21 | 15⅛ | 204,400 | 378,800 | Colgate-Palm.-Peet | No | 1,956,086 | .75 | 1.40 | 1.36 |
| 103 | 104½ | 102¼ | 106½ | 100 | 107¼ | 101 | 1,600 | 6,800 | 6% pfd. | 100 | 246,496 | 6.00 | 17.12 | 16.79 |
| 125 | 125½ | 112¼ | 136½ | 94 | 101¼ | 67 | 8,900 | 16,900 | Columbian Carbon | No | 537,586 | 5.75 | 7.48 | 5.56 |
| 18⅜ | 21¼ | 18 | 24⅝ | 14¼ | 23⅞ | 16½ | 153,600 | 638,600 | Commercial Solvents | No | 2,635,371 | .80 | .84 | 1.02 |
| 67½ | 71¼ | 65⅞ | 82½ | 63⅝ | 78⅜ | 60 | 27,700 | 82,200 | Corn Products | 25 | 2,530,000 | 3.75 | ..... | 2.62 |
| 160 | 171½ | 160 | 170 | 158 | 165 | 148¼ | 500 | 2,800 | 7% cum. pfd. | 100 | 243,739 | 7.00 | ..... | 33.97 |
| 73 | 76⅛ | 61 | 63 | 42 | 50⅜ | 35½ | 3,300 | 10,600 | Devoe & Rayn. A | No | 95,000 | 2.00 | 4.49 | 2.89 |
| 159½ | 180⅛ | 156 | 184¾ | 133 | 146½ | 86⅝ | 35,800 | 100,900 | DuPont de Nemours | 20 | 11,049,470 | 6.10 | 7.56 | 5.04 |
| 132⅞ | 135½ | 131½ | 136½ | 129 | 132 | 126⅞ | 2,300 | 6,100 | 6% cum. deb. | 100 | 1,092,699 | 6.00 | 84.21 | 56.81 |
| 164 | 175¼ | 159 | 185 | 156 | 172¼ | 110½ | 13,300 | 28,700 | Eastman Kodak | No | 2,250,921 | 6.75 | 8.24 | 6.90 |
| 157 | 163 | 157 | 166 | 152 | 164 | 141 | 580 | 1,010 | 6% cum. pfd. | 100 | 61,657 | 6.00 | 306.64 | 258.09 |
| 29½ | 32¼ | 26⅝ | 35⅝ | 23½ | 30⅝ | 17¼ | 28,300 | 154,200 | Freeport Texas | 10 | 796,380 | 1.00 | 2.43 | 1.78 |
| 117 | 117 | 109½ | 135 | 108 | 125 | 112½ | 130 | 280 | 6% conv. pfd. | 100 | 12,031 | 6.00 | 163.38 | 121.30 |
| 47½ | 51½ | 43⅝ | 55¼ | 39½ | 49½ | 23¾ | 18,300 | 108,400 | Glidden Co. | No | 603,304 | 2.00 | 3.29 | 2.91 |
| 45 | 51½ | 43⅝ | 56 | 52¼ | | | 2,300 | 8,800 | 4½% cum. pfd. | 50 | 200,000 | 2.25 | 15.43 | .. |
| 104¼ | 109¾ | 101 | 133 | 99⅝ | 119½ | 85 | 1,800 | 9,300 | Hazel Atlas | 25 | 434,409 | 7.64 | 6.56 | 7.58 |
| 166 | 185 | 128⅛ | 5⅞ | 2⅛ | 90 | 71 | 1,400 | 11,100 | Hercules Powder | No | 583,672 | 5.44 | 6.33 | 4.23 |
| 128⅜ | 135½ | 128⅛ | 47¼ | 22¾ | 131 | 122 | 250 | 720 | 6% cum. pfd. | 100 | 105,765 | 6.00 | 48.97 | 36.30 |
| 39⅛ | 40½ | 36¼ | 66⅜ | 43¾ | 36⅜ | 23½ | 45,300 | 132,500 | Industrial Rayon | No | 606,500 | 2.10 | 2.24 | 1.00 |
| 8½ | 9 | 5 | 30 | 23 | 5 | 2⅜ | 62,700 | 366,100 | Intern. Agricul. | No | 436,049 | None | ..... | 1.55 |
| 57¼ | 59½ | 42 | 36¾ | 29¾ | 42¾ | 26 | 8,500 | 59,300 | 7% cum. pr. pfd. | 100 | 100,000 | None | ..... | 2.23 |
| 69⅛ | 73⅜ | 62⅛ | 80¼ | 47¼ | 47¼ | 22¼ | 202,200 | 611,900 | Intern. Nickel | No | 14,584,025 | 1.30 | 2.40 | 1.65 |
| 27 | 28¾ | 26 | 46½ | 32½ | 36¼ | 25 | 1,700 | 6,100 | Intern. Salt | No | 240,000 | 2.00 | 1.65 | 1.32 |
| 33¾ | 36 | 31½ | 42¾ | 27½ | 36¼ | 31 | 1,500 | 7,200 | Kellogg (Spencer) | No | 500,000 | 1.60 | .. | ..... |
| 70¾ | 79 | 67¼ | 103 | 79 | 49¼ | 21½ | 25,700 | 105,000 | Libbey Owens Ford | No | 2,503,168 | 3.50 | 4.15 | 3.26 |
| 52 | 53⅞ | 43⅜ | 36½ | 26⅜ | 37¼ | 24½ | 15,600 | 54,100 | Liquid Carbonic | No | 342,406 | 1.60 | ..... | 3.06 |
| 37½ | 41¾ | 36 | 171 | 155 | 33⅞ | 23¾ | 17,200 | 46,200 | Mathieson Alkali | No | 830,428 | 1.50 | 1.76 | 1.44 |
| 92½ | 101 | 89 | 147 | 137¾ | 94¾ | 55 | 15,200 | 39,100 | Monsanto Chem. | 10 | 1,114,409 | 3.00 | 4.01 | 3.84 |
| 39½ | 44 | 33¾ | 40 | 9 | 20⅝ | 14½ | 114,500 | 205,100 | National Lead | 10 | 3,095,100 | .875 | 1.71 | 1.08 |
| 167 | 171 | 167 | 164 | 125 | 162½ | 150 | 600 | 1,600 | 7% cum. "A" pfd. | 100 | 213,793 | 7.00 | 33.83 | 25.40 |
| 148 | 150 | 144 | 56 | 40¼ | 140½ | 121¾ | 310 | 780 | 6% cum. "B" pfd. | 100 | 77,462 | 6.00 | 74.50 | 49.05 |
| 34½ | 41¾ | 33¼ | 122½ | 115¾ | 10⅜ | 4¾ | 103,200 | 447,900 | Newport Industries | 1 | 519,347 | .60 | .98 | .57 |
| 185 | 200 | 150 | 13 | 5⅜ | 129 | 80 | 7,900 | 18,900 | Owens-Illinois Glass | 25 | 1,330,602 | 6.00 | 7.53 | 6.52 |
| 60¼ | 65½ | 55½ | 146 | 84 | 53¾ | 42⅜ | 27,600 | 116,000 | Procter & Gamble | No | 6,410,000 | 1.87 | ..... | 2.39 |
| 115 | 118½ | 114½ | 135 | 126 | 121 | 115 | 450 | 1,170 | 5% pfd. (ser. 2-1-29) | 100 | 171,569 | 5.00 | ..... | 94.14 |
| 14⅝ | 15⅜ | 11⅞ | 41⅜ | 25⅝ | 8¾ | 4 | 77,100 | 197,900 | Tenn. Corp. | 5 | 857,896 | .15 | ..... | .22 |
| 42½ | 44 | 38½ | 44¼ | 33 | 36¾ | 28¾ | 36,400 | 104,000 | Texas Gulf Sulphur | No | 2,540,000 | 2.50 | ..... | 1.94 |
| 104 | 111 | 101½ | 105¼ | 71⅝ | 75¾ | 44 | 46,700 | 134,600 | Union Carbide & Carbon | No | 8,903,138 | 2.30 | 4.09 | 3.06 |
| 83½ | 91 | 79 | 96¾ | 68 | 78 | 46 | 14,000 | 27,100 | United Carbon | No | 397,877 | 4.05 | 5.54 | 4.71 |
| 40⅝ | 43⅝ | 37½ | 59 | 31¼ | 50⅝ | 35⅛ | 68,600 | 209,700 | U. S. Indus. Alco. | No | 391,033 | 1.00 | —.20 | 2.16 |
| 36 | 39⅜ | 28¼ | 30½ | 16¼ | 21¾ | 11¼ | 149,400 | 392,800 | Vanadium Corp.-Amer. | No | 366,637 | None | .40 | —1.13 |
| 11½ | 12⅞ | 7⅜ | 8½ | 4⅜ | 4⅝ | 2½ | 208,600 | 396,600 | Virginia-Caro. Chem. | No | 486,000 | None | ..... | 2.56 |
| 66¾ | 68¾ | 54⅛ | 58¾ | 28¾ | 35¾ | 17½ | 56,800 | 129,800 | 6% cum. part. pfd. | 100 | 213,392 | None | ..... | .16 |
| 23½ | 27¼ | 23⅛ | 32 | 19¼ | 25½ | 16¾ | 6,000 | 30,500 | Westvaco Chlorine | No | 284,962 | .75 | ..... | 1.63 |
| 31½ | 34⅞ | 31½ | 35¼ | 31¾ | | | 2,800 | 15,600 | Westvaco Chlorine, cum. pfd. | 30 | 192,000 | 1.50 | ..... | ..... |
| **NEW YORK CURB EXCHANGE** | | | | | | | | | | | | | | |
| 32⅝ | 35⅞ | 29½ | 40¼ | 29¼ | 30 | 15 | 63,200 | 188,200 | Amer. Cyanamid "B" | No | 2,404,194 | 1.00 | ..... | 1.61 |
| 2⅜ | 2⅞ | 2⅛ | 3¾ | 2⅛ | 4 | 2 | 3,000 | 11,800 | British Celanese Am. R. | 10 | 2,806,000 | None | ..... | —.71% |
| 113 | 113½ | 108½ | 116¼ | 99¼ | 115 | 90 | 2,500 | 5,025 | Celanese, 7% cum. 1st pfd. | 100 | 148,179 | 7.00 | 24.47 | 21.96 |
| 14½ | 15 | 10⅛ | 16½ | 9 | 15 | 7 | 2,800 | 8,600 | Celluloid Corp. | 15 | 194,952 | None | —.80 | —.95 |
| 12½ | 14⅝ | 12½ | 15 | 11⅞ | 14½ | 11⅝ | 600 | 1,900 | Courtaulds' Ltd. | 1 £ | 24,000,000 | 7½% | ..... | 7.51% |
| 145½ | 159¼ | 135 | 142¼ | 94⅛ | 105½ | 80½ | 3,100 | 9,700 | Dow Chemical | No | 945,000 | 2.40 | ..... | 4.42 |
| 9⅜ | 10⅝ | 6¾ | 10¾ | 5 | 12½ | 6¼ | 5,900 | 39,700 | Duval Texas Sulphur | No | 500,000 | .50 | ..... | .16 |
| 41¾ | 42⅛ | 39⅞ | 55 | 39 | 58 | 37 | 1,000 | 3,400 | Heyden Chem. Corp. | 10 | 149,997 | 2.25 | 3.56 | 3.22 |
| 134¾ | 147½ | 125 | 140 | 98¼ | 97¼ | 46¾ | 5,700 | 21,400 | Pittsburgh Plate Glass | 25 | 2,141,305 | 6.00 | ..... | 5.32 |
| 139 | 154¾ | 133 | 154½ | 117 | 128⅞ | 84 | 5,100 | 20,650 | Sherwin Williams | 25 | 635,583 | 4.00 | 8.04 | 6.19 |
| 108 | 114 | 108 | 116 | 110 | 113½ | 106 | 180 | 670 | 5% pfd. cum. | 100 | 155,521 | 5.00 | 41.44 | 33.17 |
| **PHILADELPHIA STOCK EXCHANGE** | | | | | | | | | | | | | | |
| 172¼ | 175¾ | 162 | 179 | 114¼ | 116¾ | 76½ | 500 | 2,345 | Pennsylvania Salt | 50 | 150,000 | 8.50 | 10.59 | 7.74 |

| Mar. Last | 1937 High | 1937 Low | 1936 High | 1936 Low | 1935 High | 1935 Low | Sales | Bonds | Date Due | Int. % | Int. Period | Out-standing $ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **NEW YORK STOCK EXCHANGE** | | | | | | | Mar. 1937 | 1937 | | | | |
| 106¾ | 109½ | 106¾ | 117½ | 107¾ | 116 | 104½ | 451,000 | 1,538,000 | Amer. I. G. Chem. Conv. 5½'s | 1949 | 5½ M. N. | 29,929,000 |
| 40 | 42½ | 36½ | 42½ | 27½ | 29¾ | 7⅜ | 528,000 | 1,307,000 | Anglo Chilean Nitrate inc. deb. | 1967 | 4½-5 | 12,433,000 |
| 103¼ | 103¾ | 102⅛ | 102¾ | 92½ | 94½ | 77⅓ | 89,000 | 240,000 | By-Products Coke Corp. 1st 5½'s "A" | 1945 | 5½ M. N. | 4,932,000 |
| 101 | 102 | 100¾ | 102¾ | 96¾ | 100¼ | 91⅛ | 36,000 | 85,000 | Int. Agric. Corp. 1st Coll. tr. stpd. to 1942 | 1942 | 5 M. N. | 5,994,100 |
| 43 | 44 | 37⅛ | 39 | 21 | 21½ | 7 | 232,000 | 1,181,000 | Lautaro Nitrate conv. b's | 1954 | 6 J. J. | 31,357,000 |
| 20¾ | 25½ | 20¾ | 35 | 23½ | 38 | 32¼ | 6,000 | 13,000 | Ruhr Chem. 6's | 1948 | 6 A. O. | 3,156,000 |
| 103⅜ | 105 | 103 | 105 | 103 | 104 | 91½ | 78,000 | 106,000 | Tenn. Corp. deb. 6's "B" | 1944 | 6 M. S. | 3,007,900 |
| 106½ | 108½ | 98¼ | 98½ | 85¾ | 94¼ | 66 | 330,000 | 726,000 | Vanadium Corp. conv. 5's | 1941 | 5 A. A. | 4,261,000 |

* Paid in 1936, including extras; ** For either fiscal or calendar years.

# Industrial Trends

## Business Activity at a High Rate in March Despite the Uncertainty of the Labor Situation—Steel Output at Record Levels—Chemical Tonnages Slightly Disappointing—

Business activity continued at a very high rate throughout the past month despite the increasing uneasiness forced upon the country's industrial leaders by the action of the C. I. O. in extending the scope of its sit-down strikes. The automotive industry continued to be a focal point in the drive by Labor Leader Lewis and the Chrysler plants were held by the strikers for several weeks.

Commodity markets were only slightly affected by the labor situation, some recessions were noted in the metals, but all of the accepted indices of wholesale commodity prices showed net gains for the first three weeks of March. The stock market was not so fortunate. General uneasiness developed and price recessions and a sizable decline in the volume of trading developed. The warnings from certain Washington spokesmen on the dangers ahead if boom conditions keep increasing, did not have a very cheerful effect on sentiment and was quite mystifying, considering the source.

Steel mill activity set an all-time record in the third week of the month when production moved up to 90.7% of capacity. How much of this feverish state of operations has been caused by fear of possible labor troubles and how much is the direct result of improved conditions is difficult to ascertain. There can be little doubt that the new international armament race is an important factor.

There is a possibility that final figures for March on retail trade will show a gain of 15% over the corresponding period of '36. The Easter influence was largely responsible, of course, for the sharp gain. Even cold weather failed to dampen the buying ardor. Wholesale trade reflected the better state of consumer purchasing. In the Detroit area, however, both retail and wholesale trade suffered from the strike conditions prevailing.

In contrast with the 10-16% gain in retail buying purchasing for industrial needs slowed down somewhat in March. Buyers showed considerable reluctance to place forward orders and the volume for the month was a bit disappointing. It is quite probable that the total was under the January figure, whereas the seasonal trend is definitely upward in March.

### Gain in Carloadings

Both carloadings and electrical output reflect the gains in business over the corresponding period of last year. Engineering construction awards in the third week of the month totalled $49,006,000, the second highest of the year. Private construction figures are encouraging, and much wider gains are anticipated shortly as the building season gets under way.

Although at the moment the labor problem is resulting in some recessions in certain industries a growing number of business analysts are expressing the opinion that the current rate or even a higher rate of activity will prevail for many months to come. At the turn of the year numerous forecasts were made that a recession would certainly take place no later than the middle of the second quarter. Now most forecasters state that good business can be expected over the next 6 months. While the wave of wage increases which have been granted throughout the country will certainly add to the cost of production and may be reflected in corporation earnings in the next two quarters, nevertheless the purchasing power of the masses will be such as to permit purchasing of many items in what may be termed the "luxury" class.

While March tonnages of chemical shipments were slightly disappointing the outlook for April and May is very promising. Mixed fertilizer sales to date reflect the greatly improved condition of the farmers. Paint manufacturers are preparing for the best spring season since '29. A settlement of the labor situation in the Detroit area would immediately be reflected in better demand for lacquers and solvents. Other industries which are large chemical consumers and which are operating at high levels include glass, tanning, rubber, and paper. April may very likely be a better chemical tonnage month than March.

## Cuban Chemical Trade

Continuing the trend that has been evident since '34, Cuban trade in chemicals and related products recorded marked improvement last year, according to reports from Assistant American Trade Commissioner J. P. Hoover, Havana, made public by the Commerce Department's Chemical Division. Activity in the Island's chemical consuming industries resulted in an increase in imports of all classes of chemical products during the year.

## Tunisia Rock Exports

The '36 exports from Tunisia of phosphate rock show an increase of 12% as compared with '35. That production did not keep pace with exports, may be attributable to the fact that large reserve stocks have been maintained at ports of shipment. Both production and exports were, however, below the '34 totals in metric tons.

## Statistics of Business

| | February 1937 | February 1936 | January 1937 | January 1936 | December 1936 | December 1935 |
|---|---|---|---|---|---|---|
| Automotive Production | ..... | ..... | 379,843 | 364,004 | 498,721 | 404,528 |
| Bldg. Contracts*‡ | $188,590 | $140,417 | $242,844 | $214,792 | $199,695 | $264,126 |
| Failures, Dun & Bradstreet | 721 | 856 | 811 | 1,077 | 692 | 910 |
| Merchandise Imports‡ | $277,805 | $192,774 | $240,396 | $187,482 | $239,835 | $179,760 |
| Merchandise Exports‡ | $232,504 | $182,029 | $221,550 | $198,564 | $226,605 | $220,931 |
| **Newsprint Production** | | | | | | |
| Canada, tons | 275,532 | 221,569 | 287,691 | 227,955 | 289,312 | 244,732 |
| U. S., tons | 72,072 | 72,252 | 80,005 | 79,362 | 80,048 | 75,869 |
| Plate Glass, prod., sq. ft. | 18,676,371 | 13,856,937 | 6,373,282 | 17,275,632 | 7,371,236 | 16,112,218 |
| Steel ingots production, tons | 4,424,659 | 2,964,418 | 4,736,697 | 3,045,746 | 4,431,000 | 3,073,000 |
| Pig iron production, tons | 2,994,883 | 1,823,706 | 3,211,500 | 2,025,885 | 3,095,145 | 2,106,453 |
| U. S. consumption, crude rubber, tons | ..... | 36,746 | 48,744 | 48,506 | 49,626 | 42,942 |
| Tire shipments | ..... | ..... | ..... | 3,874,764 | 5,015,872 | 4,081,153 |
| Tire production | ..... | ..... | ..... | 4.578,710 | 5,311,007 | 4,051,286 |
| Tire inventory | ..... | ..... | ..... | 8,918.177 | 11,114,399 | 8,195,863 |
| **Dept. of Labor Indices†** | | | | | | |
| Factory payrolls, totals† | 95.7 | 73.7 | 90.6 | 95.1 | 94.6 | 77.4 |
| Factory employment† | 98.9 | 86.9 | 96.4 | 86.8 | 97.7 | 88.2 |
| Chemical employment†a | ..... | 109.1 | 120.3 | 110.8 | 119.3 | 112.3 |
| Chemical payrolls†a | ..... | 97.5 | 118.9 | 98.8 | 118.0 | 101.1 |
| **Chemicals and Related Products** | | | | | | |
| Exports‡ | $9,950 | $8,936 | $9,200 | $9,096 | ..... | $8,873 |
| Imports‡ | $9,739 | $7,946 | $8,486 | $5,955 | ..... | $6,482 |
| Stocks, mfg. goods | ..... | 128 | ..... | 124 | ..... | 120 |
| Stocks, raw materials | ..... | 89 | ..... | 98 | ..... | 106 |
| Boot and shoe production | ..... | ..... | 36,674,179 | 33,355,004 | 33,380,528 | ..... |

| Week Ending | Carloadings 1937 | Carloadings 1936 | Carloadings % of Change | Electrical Output§ 1937 | Electrical Output§ 1936 | Electrical Output§ % of Change | Jour. of Com. Price Index | Nat'l Fertilizer Ass'n Price Indices: Chem. & Drugs | Fats & Oils | Fert. Mat. | Mixed Fert. | All Groups | ‡‡Labor Dept. Chem. & Drug Price Index | % Steel Activity | N. Y. Times Index Bus. Act. | Fisher's Index Pur. Power |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Feb. 27 | 696,727 | 672,869 | + 3.5 | 2,207,285 | 1,941,633 | +13.7 | 88.8 | 95.3 | 88.4 | 71.0 | 76.7 | 85.9 | 87.5 | 85.8 | 107.3 | 110.0 |
| Mar. 6 | 734,127 | 634,570 | +15.7 | 2,199,976 | 1,903,363 | +15.6 | 90.6 | 95.3 | 88.4 | 76.7 | 71.0 | 86.4 | 87.1 | 87.3 | 106.7 | 110.1 |
| Mar. 13 | 748,993 | 616,937 | +21.4 | 2.212,897 | 1,893,311 | +16.9 | 91.7 | 95.3 | 90.1 | 70.8 | 76.7 | 87.8 | 87.3 | 88.9 | 106.9 | 109.9 |
| Mar. 20 | 759,269 | 569,100 | +33.5 | 2,211,052 | 1,900,803 | +16.3 | 92.6 | 95.3 | 90.7 | 70.8 | 76.9 | 88.6 | 87.3 | 89.6 | 106.6 | 109.8 |
| Mar. 27 | ..... | ..... | ..... | 2,200,143 | 1,862,387 | +18.1 | 92.6 | .... | .... | .... | .... | .... | .... | 90.7 | .... | .... |

* 37 states; † Dept. of Labor, 3 year average, 1923-1925 = 100.0; ‡ 000 omitted; § K.W.H., 000 omitted; *a* Includes all allied products but not petroleum refining; ‡‡ 1926-1928 = 100.0; *y* Preliminary; *z* Revised.

# Prices Current

***Heavy Chemicals, Coal-tar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Petroleum Solvents and Chemicals, Naval Stores, Fats and Oils, etc.***

**Chemical prices** quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Import chemicals are so designated. Resale stocks when a market factor are quoted in addition to maker's prices and indicated "second hands."

**Oils** are quoted spot New York, ex-dock. Quotations f. o. b. mills, or for spot goods at the Pacific Coast are so designated.

**Raw materials** are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

**The current range** is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

**Purchasing Power of the Dollar: 1926 Average—$1.00 - 1936 Average $1.18 - Jan. 1936 $1.19 - Mar. 1937 $1.09**

| | | Current Market | 1937 Low | 1937 High | 1936 Low | 1936 High |
|---|---|---|---|---|---|---|
| Acetaldehyde, drs, c-l, wks | lb. | ... | .14 | ... | .14 | ... | .14 |
| Acetaldol, 95%, 50 gal drs wks | lb. | .21 | .25 | .21 | .25 | .21 | .25 |
| Acetamide, tech, lcl, kegs | lb. | .32 | .43 | .32 | .43 | .38 | .43 |
| Acetanalid, tech, 150 lb bbls | lb. | .24 | .26 | .24 | .26 | .24 | .26 |
| Acetic Anhydride, 100 lb cbys | lb. | .20 | .24 | .20 | .24 | .21 | .25 |
| drs, f.o.b. wks, frt allowed | lb. | .14 | .15 | .14 | .15 | ... | .15 |
| Acetin, tech, drs | lb. | .22 | .24 | .22 | .24 | .22 | .24 |
| Acetone, tks, f.o.b. wks, frt allowed | lb. | ... | .06 | ... | .06 | .06 | .11 |
| drs, c-l, f.o.b. wks, frt allowed | lb. | ... | .07 | ... | .07 | .07 | .12 |
| Acetyl chloride, 100 lb cbys | lb. | .55 | .68 | .55 | .68 | .55 | .68 |
| **ACIDS** | | | | | | | |
| Abietic, kgs, bbls | lb. | ... | .10 | .06¾ | .10 | .06¾ | .07 |
| Acetic, 28%, 400 lb bbls, c-l, wks | 100 lbs. | ... | 2.25 | 2.25 | 2.45 | ... | 2.45 |
| glacial, bbls, c-l, wks | 100 lbs. | ... | 8.00 | 8.00 | 8.43 | ... | 8.43 |
| glacial, USP, bbls, c-l, wks | 100 lbs. | ... | 10.50 | 10.50 | 12.43 | ... | 12.43 |
| Adipic, kgs, bbls | lb. | ... | .72 | ... | .72 | ... | .72 |
| Anthranilic, ref'd, bbls | lb. | .85 | .95 | .85 | .95 | .85 | .95 |
| tech, bbls | lb. | ... | .75 | ... | .75 | ... | .75 |
| Battery, cbys, delv | 100 lbs. | 1.35 | 2.50 | 1.35 | 2.50 | 1.35 | 2.50 |
| Benzoic, tech, 100 lb kgs | lb. | .43 | .47 | .43 | .47 | .40 | .45 |
| USP, 100 lb kgs | lb. | .54 | .59 | .54 | .59 | .54 | .59 |
| Boric, tech, gran, 80 tons, bgs, delv | ton *a* | ... | 95.00 | ... | 95.00 | ... | 95.00 |
| Broenner's, bbls | lb. | ... | 1.11 | ... | 1.11 | 1.11 | 1.25 |
| Butyric, edible, c-l, wks, cbys | lb. | 1.20 | 1.30 | 1.20 | 1.30 | 1.20 | 1.30 |
| synthetic, c-l, drs | lb. | ... | .22 | ... | .22 | ... | .22 |
| wks | lb. | ... | .23 | ... | .23 | ... | .23 |
| tks, wks | lb. | ... | .21 | ... | .21 | ... | .21 |
| Camphoric, drs | lb. | 5.50 | 5.70 | 5.50 | 5.70 | ... | 5.25 |
| Chicago, bbls | lb. | ... | 2.10 | ... | 2.10 | ... | 2.10 |
| Chlorosulfonic, 1500 lb drs, wks | lb. | .03½ | .05 | .03½ | .05 | .03½ | .05 |
| Chromic, 99¾%, drs, delv | lb. | .14¾ | .16¾ | .14¾ | .16¾ | .14¾ | .16¾ |
| Citric, USP, crys, 230 lb bbls | lb. *b* | .25 | .26 | .25 | .26 | .25 | .29 |
| anhyd, gran, bbls | lb. *b* | ... | .29 | ... | .29 | .29 | .31 |
| Cleve's, 250 lb bbls | lb. | .50 | .52 | .50 | .52 | .50 | .54 |
| Cresylic, 99%, straw, HB, drs, wks, frt equal | gal. | ... | .85 | .72 | .85 | .51 | .74 |
| 99%, straw, LB, drs, wks, frt equal | gal. | .77 | .79 | .77 | .79 | .68 | .79 |
| resin grade, drs, wks, frt equal | lb. | .09 | .09½ | .09 | .09½ | .52*y* | .65*y* |
| Crotonic, drs | lb. | .90 | 1.00 | .90 | 1.00 | .90 | 1.00 |
| Formic, tech, 140 lb drs | lb. | .11 | .13 | .11 | .13 | .11 | .13 |
| Fumaric, bbls | lb. | ... | .60 | ... | .60 | ... | .60 |
| Fuming, see Sulfuric (Oleum) | | | | | | | |
| Fuoric, tech, 90%, 100 lb. drs | lb. | ... | .35 | ... | .35 | ... | .35 |
| Gallic, tech, bbls | lb. | .65 | .68 | .65 | .68 | .65 | .68 |
| USP, bbls | lb. | .77 | .80 | .77 | .80 | .70 | .80 |
| Gamma, 225 lb bbls, wks | lb. | ... | .85 | ... | .85 | .80 | .85 |
| H, 225 lb bbls, wks | lb. | .50 | .55 | .50 | .55 | .50 | .55 |
| Hydriodic, USP, 10% sol. cbys | lb. | .50 | .51 | .50 | .51 | .50 | .51 |
| Hydrobromic, 48% com 155 lb cbys, wks | lb. | .45 | .48 | .45 | .48 | .45 | .48 |
| Hydrochloric, see muriatic. | | | | | | | |
| Hydrocyanic, cyl, wks | lb. | .80 | 1.30 | .80 | 1.30 | .80 | 1.30 |
| Hydrofluoric, 30%, 400 lb bbls, wks | lb. | .07 | .07½ | .07 | .07½ | .07 | .07½ |
| Hydrofluosilicic, 35%, 400 bbls, wks | lb. | .10½ | .15 | .10½ | .15 | .11 | .12 |
| Lactic, 22%, dark, 500 lb bbls | lb. | .02½ | .02¾ | .02½ | .02¾ | .02½ | .05 |
| 22%, light ref'd, bbls | lb. | .03½ | .03¾ | .03½ | .03¾ | .03½ | .07 |
| 44%, light, 500 lb bbls | lb. | .05½ | .05¾ | .05½ | .05¾ | .05½ | .12 |
| 44%, dark, 500 lb bbls | lb. | .06½ | .06¾ | .06½ | .06¾ | .06½ | .10 |
| 50%, water white, 500 lb bbls | lb. | .10½ | .11½ | .10½ | .11½ | .10½ | .14½ |
| USP X, 85%, cbys | lb. | .45 | .50 | .45 | .50 | .45 | .50 |
| Laurent's, 250 lb bbls | lb. | .45 | .46 | .45 | .46 | .45 | .47 |
| Linoleic, bbls | lb. | ... | .20 | .16 | .20 | .16 | .16 |
| Maleic, powd, kgs | lb. | .29 | .32 | .29 | .32 | .29 | .32 |
| Malic, powd, kgs | lb. | .45 | .60 | .45 | .60 | .45 | .60 |
| Metanillic, 250 lb bbls | lb. | .60 | .65 | .60 | .65 | .60 | .65 |
| Mixed, tks, wks | N unit | .06½ | .07¼ | .06½ | .07¼ | .06½ | .07¼ |
| | S unit | .008 | .009 | .008 | .009 | .008 | .009 |
| Monochloracetic, tech, bbls | lb. | .16 | .18 | .16 | .18 | .16 | .18 |
| Monosulfonic, bbls | lb. | 1.50 | 1.60 | 1.50 | 1.60 | 1.50 | 1.60 |
| Muriatic, 18°, 120 lb cbys, c-l, wks | 100 lb. | ... | 1.35 | ... | 1.35 | ... | 1.35 |
| tks, wks | 100 lb. | ... | 1.00 | ... | 1.00 | ... | 1.00 |
| 20°, cbys, c-l, wks | 100 lb. | ... | 1.45 | ... | 1.45 | ... | 1.45 |
| tks, wks | 100 lb. | ... | 1.10 | ... | 1 10 | 1.10 | 1.20 |
| 22°, c-l, cbys, wks | 100 lb. | ... | 1.95 | ... | 1.95 | ... | 1.95 |
| tks, wks | 100 lb. | ... | 1.60 | ... | 1.60 | ... | 1.60 |
| CP, cbys | lb. | .06½ | .07⅛ | .06½ | .07⅛ | .06½ | .07⅛ |
| N & W, 250 lb bbls | lb. | .85 | .87 | .85 | .87 | .85 | .87 |
| Naphthenic, 240-280 s.v., drs | lb. | .11 | .14 | .11 | .14 | .11 | .14 |
| Sludges, drs | lb. | .06 | .10 | .06 | .10 | .06 | .10 |
| Naphthionic, tech, 250 lb bbls | lb. | .60 | .65 | .60 | .65 | .60 | .65 |
| Nitric, 36°, 135 lb cbys, c-l, wks | 100 lb. *c* | ... | 5.00 | ... | 5.00 | ... | 5.00 |
| 38°, c-l, cbys, wks | 100 lb. *c* | ... | 5.50 | ... | 5.50 | ... | 5.50 |
| 40°, cbys, c-l, wks | 100 lb. *c* | ... | 6.00 | ... | 6.00 | ... | 6.00 |
| 42°, c-l, cbys, wks | 100 lb. *c* | ... | 6.50 | ... | 6.50 | ... | 6.50 |
| CP, cbys, delv | lb. | .11½ | .12½ | .11½ | .12½ | .11½ | .12½ |
| Oxalic, 300 lb bbls, wks, or N. Y. | lb. | .10¾ | .12 | .10¾ | .12 | .10¾ | .12½ |
| Phosphoric, 50%, USP, cbys | lb. | .12 | .14 | .12 | .14 | .14 | .14 |
| 50%, acid, c-l, drs, wks | lb. | .06 | .08 | .06 | .08 | .06 | .08 |
| 75%, acid, c-l, drs, wks | lb. | .09 | .10½ | .09 | .10½ | .09 | .10½ |
| Picramic, 300 lb bbls, wks | lb. | .65 | .70 | .65 | .70 | .65 | .70 |
| Picric, kgs, wks | lb. | .30 | .40 | .30 | .40 | .30 | .40 |
| Propionic, 98% wks, drs | lb. | ... | .22 | ... | .22 | ... | .35 |
| 80% | lb. | .16 | .17½ | .16 | .17½ | .15 | .17½ |
| Pyrogallic, crys, kgs, wks | lb. | 1.55 | 1.65 | 1.55 | 1.65 | 1.55 | 1.65 |
| Ricinoleic, bbls | lb. | ... | .35 | ... | ... | ... | ... |
| Salicylic, tech, 125 lb bbls, wks | lb. | ... | .33 | ... | .33 | ... | .40 |
| Sebacic, tech, drs, wks | lb. | ... | .58 | ... | .58 | ... | .58 |
| Succinic, bbls | lb. | ... | .75 | ... | .75 | ... | .75 |
| Sulfanilic, 250 lb bbls, wks | lb. | .17 | .18 | .17 | .18 | .17 | .19 |
| Sulfuric, 60°, tks, wks | ton | ... | 12.00 | ... | 12.00 | 11.00 | 12.00 |
| c-l, cbys, wks | 100 lb. | ... | 1.10 | ... | 1.10 | ... | 1.10 |
| 66°, tks, wks | ton | ... | 15.50 | ... | 15 50 | ... | 15.50 |
| c-l, cbys, wks | 100 lb. | ... | 1.35 | ... | 1.35 | ... | 1.35 |
| CP, cbys, wks | lb. | .06½ | .07½ | .06½ | .07½ | .06½ | .07½ |
| Fuming (Oleum) 20% tks, wks | ton | ... | 18.50 | ... | 18.50 | ... | 18.50 |
| Tannic, tech, 300 lb bbls | lb | .19 | .36 | .19 | .36 | .19 | .40 |
| Tartaric, USP, gran, powd, 300 lb bbls | lb. | ... | .22¾ | .21¾ | .22¾ | .22¾ | .24 |
| Tobias, 250 lb bbls | lb. | .65 | .67 | .65 | .67 | .65 | .72½ |
| Trichloroacetic bottles | lb. | 2.00 | 2.50 | 2.00 | 2.50 | 2.45 | 2.75 |
| kgs | lb. | ... | 1.75 | ... | 1.75 | ... | 1.75 |
| Tungstic, tech, bbls | lb. | 1.50 | 1.60 | 1.50 | 1.60 | 1 50 | 1.60 |
| Vanadic, drs, wks | lb. | 1.10 | 1.20 | 1.10 | 1.20 | 1.10 | 1.20 |
| Albumen, light flake, 225 lb bbls | lb. | .47 | .60 | .47 | .60 | .50 | .60 |
| dark, bbls | lb. | .11 | .15 | .11 | .17 | .12 | .17 |
| egg, edible | lb. | .77 | .78 | .78 | .79 | .77 | 1.05 |
| vegetable, edible | lb. | .65 | nom. | ... | nom. | .65 | .70 |
| **ALCOHOLS** | | | | | | | |
| Alcohol, Amyl (from Pentane) tks, delv | lb. | ... | .123 | ... | .123 | .123 | .143 |
| c-l, drs, delv | lb. | ... | .133 | ... | .133 | .133 | .150 |
| lcl, drs, delv | lb. | ... | .143 | ... | .143 | .143 | .157 |
| Amyl, secondary, tks, delv | lb. | ... | .08½ | ... | .08½ | .08½ | .108 |
| Benzyl, bottles | lb. | .65 | 1.10 | .65 | 1.10 | .65 | 1.10 |
| Butyl, normal, tks, f.o.b. wks, frt allowed | lb. *d* | ... | .09 | .08½ | .09 | .08½ | .11 |
| c-l, drs, f.o.b. wks, frt allowed | lb. *d* | ... | .10 | .09½ | .10 | .09½ | .12 |
| Butyl, secondary, tks, delv | lb. *d* | ... | .07 | ... | .07 | .07 | .096 |
| c-l, drs, delv | lb. *d* | ... | .08 | ... | .08 | .08 | .106 |
| Capryl, drs, tech, wks | lb. | ... | .85 | ... | .85 | ... | .85 |
| Cinnamic, bottles | lb. | 2.50 | 3.65 | 2.50 | 3.65 | 2.50 | 3.65 |
| Denatured, CD, No. 11, 12, 13, c-l, drs, wks | gal. *e* | ... | .33 | ... | .33 | .30 | .44* |
| Western schedule, c-l, wks | gal. *e* | ... | .39 | ... | .39 | .39 | .52* |
| Denatured, SD, No. 1, tks | gal. *e* | ... | .26 | ... | .26 | .23 | .28 |
| c-l, drs, wks | gal. *e* | ... | .29 | ... | .29 | .29 | .34 |
| Diacetone, tech, tks, delv | lb. *f* | ... | .11½ | ... | .11½ | ... | .16 |
| c-l, drs, delv | lb. *f* | ... | .12½ | ... | .12½ | ... | .17 |
| Ethyl, 190 proof, molasses, tks | gal. *g* | ... | 4.07 | ... | 4.07 | 4.07 | 4.10 |
| c-l, drs | gal. *g* | ... | 4.11 | ... | 4.11 | 4.11 | 4.27 |
| c-l, bbls | gal. *g* | ... | 4.12 | ... | 4.12 | 4.12 | 4.28 |
| absolute, drs | gal. *g* | 4.54 | 6.08½ | 4.54 | 6.08½ | 4.54 | 6.11½ |

*a* Powdered boric acid $5 a ton higher in each case; USP $15 higher; *b* Powdered citric is ½c higher; kegs are in each case ½c higher than bbls. *y* Price given is per gal.

*c* Yellow grades 25c per 100 lbs. less in each case; *d* Spot prices are 1c higher; *e* Anhydrous is 5c higher in each case; *f* Pure prices are 1c higher in each case; * Dealers were given 20% off this price.

**ABBREVIATIONS**—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

| | Current Market | 1937 Low | 1937 High | 1936 Low | 1936 High |
|---|---|---|---|---|---|
| **Alcohols (continued)** | | | | | |
| Furfuryl, tech, 500 lb drs lb. | ... | .35 | ... | .35 | ... | .35 |
| Hexyl, secondary tks, delv lb. | ... | .12 | .11½ | .12 | ... | .11½ |
| c-l, drs, delv lb. | ... | .13 | .12½ | .13 | ... | .12½ |
| Normal, drs, wks lb. | 3.25 | 3.50 | 3.25 | 3.50 | 3.25 | 3.50 |
| Isoamyl, prim, cans, wks lb. | ... | .32 | ... | .32 | ... | .32 |
| drs, lcl, delvd lb. | ... | .27 | ... | .27 | ... | .27 |
| Isobutyl, ref'd, lcl, drs lb. | ... | .10 | ... | .10 | .10 | .12 |
| c-l, drs lb. | ... | .09½ | ... | .09½ | .09½ | .11½ |
| tks lb. | ... | .08½ | ... | .08½ | .08½ | .10½ |
| Isopropyl, refd, c-l, drs, f.o.b. wks, frt allowed lb. | ... | .39½ | .39½ | .45 | .45 | .55 |
| Propyl, norm, 50 gal drs gal. | ... | .75 | ... | .75 | ... | .75 |
| Special Solvent, tks, wks gal. | ... | .27 | ... | .27 | .24 | .32 |
| Aldehyde ammonia, 100 gal drs lb. | .80 | .82 | .80 | .82 | .80 | .82 |
| Alphanaphthol, crude, 300 lb bbls lb. | .. | .52 | ... | .52 | .52 | .65 |
| Alphanaphthylamine, 350 lb bbls lb. | .32 | .34 | .32 | .34 | .32 | .34 |
| Alum, ammonia, lump, c-l, bbls, wks 100 lb. | ... | 3.00 | ... | 3.00 | ... | 3.00 |
| 25 bbls or more, wks 100 lb. | ... | 3.15 | ... | 3.15 | ... | 3.15 |
| less than 25 bbls, wks 100 lb. | ... | 3.25 | ... | 3.25 | ... | 3.25 |
| Granular, c-l, bbls. wks 100 lb. | ... | 2.75 | ... | 2.75 | ... | 2.75 |
| 25 bbls or more, wks 100 lb. | ... | 2.90 | ... | 2.90 | ... | 2.90 |
| Powd, c-l, bbls, wks 100 lb. | ... | 3.15 | ... | 3.15 | ... | 3.15 |
| 25 bbls or more, wks 100 lb. | ... | 3.30 | ... | 3.30 | ... | 3.30 |
| Chrome, bbls 100 lb. | 7.00 | 7.25 | 7.00 | 7.25 | 7.00 | 7.25 |
| Potash, lump, c-l, bbls, wks 100 lb. | ... | 3.25 | ... | 3.25 | ... | 3.25 |
| 25 bbls or more, wks 100 lb. | ... | 3.40 | ... | 3.40 | ... | 3.40 |
| Granular, c-l, bbls, wks 100 lb. | ... | 3.40 | ... | 3.40 | ... | 3.40 |
| 25 bbls or more, bbls, wks 100 lb. | ... | 3.00 | ... | 3.00 | ... | 3.00 |
| Powd, c-l, bbls, wks 100 lb. | ... | 3.40 | ... | 3.40 | ... | 3.40 |
| 25 bbls or more, wks 100 lb. | ... | 3.55 | ... | 3.55 | ... | 3.55 |
| Soda, bbls, wks 100 lb. | 4.00 | 4.15 | 4.00 | 4.15 | 4.00 | 4.15 |
| Aluminum metal, c-l, NY 100 lb. | ... | 20.00 | 19.00 | 20.00 | 19.00 | 20.00 |
| Acetate, CP, 20%, bbls lb. | .09 | .10 | .09 | .10 | .09 | .10 |
| Chloride anhyd, 99%, wks lb. | .07 | .12 | .07 | .12 | .07 | .12 |
| 93%, wks lb. | .05 | .08 | .05 | .08 | .05 | .08 |
| Crystals, c-l, drs, wks lb. | .06 | .06¼ | .06 | .06¼ | .06 | .07 |
| Solution, drs, wks lb. | .02¾ | .03¼ | .02¾ | .03¼ | .02¾ | .03½ |
| Hydrate, 96%, light, 90 lb bbls, delv lb. | .13 | .15 | .13 | .15 | .13 | .15 |
| heavy, bbls, wks lb. | .029 | .03½ | .029 | .03½ | .029 | .04½ |
| Oleate, drs lb. | .16¾ | .18½ | .16¾ | .18½ | .15¾ | .18½ |
| Palmitate, bbls lb. | .22 | .23 | .22 | .23 | .21 | .22 |
| Resinate, pp., bbls lb. | ... | .15 | ... | .15 | ... | .15 |
| Stearate, 100 lb bbls lb. | .19 | .21 | .19 | .21 | .18 | .21 |
| Sulfate, com, c-l, bgs, wks 100 lb. | ... | 1.35 | ... | 1.35 | ... | 1.35 |
| c-l, bbls, wks 100 lb. | ... | 1.55 | ... | 1.55 | ... | 1.55 |
| Sulfate, iron-free, c-l, bgs, wks 100 lb. | ... | 1.90 | ... | 1.90 | ... | 1.90 |
| c-l, bbls, wks 100 lb. | ... | 2.05 | ... | 2.05 | ... | 2.05 |
| Aminoazobenzene, 110 lb kgs lb. | ... | 1.15 | ... | 1.15 | ... | 1.15 |
| Ammonia anhyd com, tks lb. | .04½ | .05½ | .04½ | .05½ | .04½ | .05½ |
| Ammonia anhyd, 100 lb cyl lb. | .16 | .22 | .16 | .22 | .15¼ | .22 |
| 26°, 800 lb drs, delv lb. | .02¼ | .02½ | .02¼ | .02½ | .02¼ | .03 |
| Aqua 26°, tks, NH cont. | ... | .04½ | ... | .04½ | .04½ | .05 |
| tk wagon lb. | ... | .02 | ... | .02 | .02 | .024 |
| Ammonium Acetate, kgs lb. | .26 | .33 | .26 | .33 | .26 | .33 |
| Bicarbonate, bbls, f.o.b. wks 100 lb. | 5.15 | 5.71 | 5.15 | 5.71 | 5.15 | 5.71 |
| Bifluoride, 300 lb bbls lb. | .16 | .17 | .16 | .17 | .15 | .17 |
| carbonate, tech, 500 lb bbls lb. | .08 | .12 | .08 | .12 | .08 | .12 |
| Chloride, White, 100 lb bbls, wks 100 lb. | 4.45 | 4.90 | 4.45 | 4.90 | 4.45 | 4.90 |
| Gray, 250 lb bbls, wks 100 lb. | 5.50 | 6.25 | 5.00 | 6.25 | 5.00 | 5.75 |
| Lump, 500 lbs cks spot lb. | .10½ | .11 | .10½ | .11 | .10½ | .11 |
| Lactate, 500 lb bbls lb. | .15 | .16 | .15 | .16 | .15 | .16 |
| Laurate, bbls lb. | ... | .23 | ... | ... | ... | ... |
| Linoleate lb. | ... | .15 | .11 | .15 | .11 | .12 |
| Naphthenate, bbls lb. | ... | .17 | ... | ... | ... | ... |
| Nitrate, tech, cks lb. | .04 | nom. | .04 | nom. | .04 | .05 |
| Oleate, drs lb. | ... | .15 | .15 | .10 | ... | .10 |
| Oxalate, neut, cryst, powd, bbls lb. | ... | .23 | ... | .23 | .26 | .27 |
| pure, cryst, bbls, kgs lb. | .27 | .28 | .27 | .28 | .27 | .28 |
| Perchlorate, kgs lb. | ... | .16 | ... | .16 | ... | .16 |
| Persulfate, 112 lb kgs lb. | .21 | .24 | .21 | .24 | .21 | .25 |
| Phosphate, dibasic tech, powd, 325 lb bbls lb. | .07½ | .10 | .07½ | .10 | .07½ | .10 |
| Ricinoleate, bbls lb. | ... | .15 | ... | ... | ... | ... |
| Stearate, anhyd, bbls lb. | ... | .24 | ... | ... | ... | ... |
| Paste, bbls lb. | ... | .07½ | ... | ... | ... | ... |
| Sulfate, dom, f.o.b., bulk ton | ... | 27.00 | 26.00 | 27.00 | 22.00 | 26.00 |
| 200 lb bgs ton | ... | nom. | ... | nom. | ... | nom. |
| 100 lb bgs lb. | ... | nom. | ... | nom. | ... | nom. |
| Sulfocyanide, kgs lb. | ... | .55 | ... | .55 | ... | .55 |
| Amyl Acetate (from pentane) tks, delv lb. | ... | .11½ | ... | .11½ | .11½ | .13½ |
| tech, drs, delv lb. | .11½ | .12 | .11½ | .13½ | .12½ | .149 |
| Secondary, tks, delv lb. | ... | .08½ | ... | .08½ | ... | .108 |
| c-l, drs, delv lb. | ... | .09½ | ... | .09½ | .118 | .123 |
| Chloride, norm, drs, wks lb. | .56 | .68 | .56 | .68 | .56 | .68 |
| mixed, drs, wks lb. | .07 | .077 | .07 | .077 | .07 | .077 |
| tks, wks lb. | ... | .06 | ... | .06 | ... | .06 |
| Mercaptan, drs, wks lb. | ... | 1.10 | ... | 1.10 | ... | 1.10 |
| Oleate, lcl, wks, drs lb. | ... | .25 | ... | .25 | ... | ... |
| Stearate, lcl, wks, drs lb. | ... | .26 | ... | .26 | ... | ... |

*g* Grain alcohol 20c a gal. higher in each case.

| | Current Market | 1937 Low | 1937 High | 1936 Low | 1936 High |
|---|---|---|---|---|---|
| Amylene, drs, wks lb. | .102 | .11 | .102 | .11 | .102 | .11 |
| tks, wks lb. | ... | .09 | ... | .09 | ... | .09 |
| Aniline Oil, 960 lb drs and tks lb. | .15 | .17½ | .15 | .17½ | .15 | .17½ |
| Annatto fine lb. | .34 | .37 | .34 | .37 | .34 | .37 |
| Anthracene, 80% lb. | ... | .75 | ... | .75 | ... | .75 |
| 40% lb. | ... | .18 | ... | .18 | ... | .18 |
| Anthraquinone, sublimed, 125 lb bbls lb. | ... | .65 | .50 | .65 | .50 | .52 |
| Antimony metal slabs, ton lots lb. | .16⅜ | .17 | .13⅜ | .17 | .11⅜ | .14 |
| Butter of, see Chloride. | | | | | | |
| Chloride, soln cbys lb. | ... | .17 | ... | .17 | .13 | .17 |
| Needle, powd, bbls lb. | .16 | .18 | .14 | .18 | .11 | .12½ |
| Oxide, 500 lb bbls lb. | .16½ | nom. | .14¼ | .16½ | .12¾ | .14 |
| Salt, 63% to 65%, tins lb. | .23¾ | .24 | .22 | .24 | .22 | .24 |
| Sulfuret, golden, bbls lb. | .22 | .23 | .22 | .23 | .22 | .23 |
| Vermilion, bbls lb. | .35 | .42 | .35 | .42 | .35 | .42 |
| Archil, conc, 600 lb bbls lb. | .21 | .27 | .21 | .27 | .21 | .27 |
| Double, 600 lb bbls lb. | .18 | .20 | .18 | .20 | .18 | .20 |
| Argols, 80%, casks lb. | .14 | .15 | .14 | .15 | .14 | .15 |
| Crude, 30%, casks lb. | .07 | .08 | .07 | .08 | .07 | .08 |
| Aroclors, wks lb. | .18 | .30 | .18 | .30 | .18 | .30 |
| Arrowroot, bbl lb. | .08¾ | .09¾ | .08¾ | .09¾ | .08¾ | .09¾ |
| Arsenic, Metal lb. | .42 | .44 | .42 | .44 | .40 | .44 |
| Red, 224 lb cs kgs lb. | ... | .15¾ | ... | .15¾ | ... | .15¾ |
| White, 112 lb kgs lb. | .03 | .04 | .03 | .04 | .03 | .04½ |
| Asbestine, c-l, wks ton | 13.00 | 15.00 | 13.00 | 15.00 | 13.00 | 15.00 |
| Barium Carbonate precip, 200 lb bgs, wks ton | 52.50 | 62.50 | 52.50 | 62.50 | 56.50 | 61.00 |
| Nat (witherite) 90% gr, c-l, wks, bgs ton | ... | 44.00 | 42.00 | 45.00 | 42.00 | 45.00 |
| Chlorate, 112 lb kgs NY lb. | .16½ | .17½ | .16½ | .17½ | .15½ | .17½ |
| Chloride, 600 lb bbl, wks ton | 72.00 | 74.00 | 72.00 | 74.00 | 72.00 | 74.00 |
| Dioxide, 88%, 690 lb drs lb. | .11 | .12 | .11 | .12 | .11 | .12 |
| Hydrate, 500 lb bbls lb. | .04¾ | .05½ | .04¾ | .05½ | .05¼ | .06 |
| Nitrate, bbls lb. | ... | .07 | ... | .07 | .07 | .08¼ |
| Barytes, floated, 350 lb bbls wks ton | 23.65 | 31.15 | 23.65 | 31.15 | 23.65 | 31.15 |
| Bauxite, bulk, mines ton | 7.00 | 10.00 | 7.00 | 10.00 | 7.00 | 10.00 |
| Bentonite, c-l, No. 1, bgs, wks ton | ... | 16.00 | ... | 16.00 | ... | 16.50 |
| No. 2 ton | ... | 11.00 | ... | 11.00 | ... | 11.00 |
| Benzaldehyde, tech, 945 lb drs, wks lb. | .60 | .62 | .60 | .62 | .60 | .62 |
| Benzene (Benzol), 90%, Ind, 8000 gal tks, frt allowed gal. | ... | .16 | ... | .16 | .16 | .18 |
| 90% c-l, drs gal. | ... | .23 | ... | .23 | ... | .23 |
| Ind pure, tks, frt allowed gal. | ... | .16 | ... | .16 | .16 | .18 |
| Benzidine Base, dry, 250 lb bbls lb. | .70 | .72 | .70 | .72 | .70 | .74 |
| Benzoyl Chloride, 500 lb drs lb. | .40 | .45 | .40 | .45 | .40 | .45 |
| Benzyl Chloride, tech, drs lb. | .30 | .40 | .30 | .40 | .30 | .40 |
| Beta-Naphthol, 250 lb bbl, wks lb. | .23 | .24 | .23 | .24 | .24 | .27 |
| Naphthylamine, sublimed, 200 lb bbls lb. | 1.25 | 1.35 | 1.25 | 1.35 | 1.25 | 1.35 |
| Tech, 200 lb bbls lb. | .51 | .52 | .51 | .52 | .51 | .55 |
| Bismuth metal lb. | 1.00 | 1.10 | 1.00 | 1.10 | 1.00 | 1.10 |
| Chloride, boxes lb. | 3.20 | 3.25 | 3.20 | 3.25 | 3.20 | 3.25 |
| Hydroxide, boxes lb. | 3.15 | 3.20 | 3.15 | 3.20 | 3.15 | 3.20 |
| Oxychloride, boxes lb. | ... | 3.04 | 2.75 | 3.04 | 2.95 | 3.00 |
| Subbenzoate, boxes lb. | 3.25 | 3.30 | 3.25 | 3.30 | 3.25 | 3.30 |
| Subcarbonate, kgs lb. | 1.32 | 1.58 | 1.32 | 1.58 | 1.40 | 1.45 |
| Trioxide, powd, boxes lb. | ... | 3.57 | 3.45 | 3.57 | 3.45 | 3.50 |
| Subnitrate lb. | 1.22 | 1.48 | 1.30 | 1.48 | 1.30 | 1.35 |
| Blackstrap, cane (see Molasses, Blackstrap). | | | | | | |
| Blanc Fixe, 400 lb bbls, wks ton *h* | 40.00 | 75.00 | 40.00 | 75.00 | 42.50 | 70.00 |
| Bleaching Powder, 800 lb drs, c-l, wks, contract 100 lb. | ... | 2.00 | ... | 2.00 | ... | 2.00 |
| lcl, drs, wks lb. | 2.25 | 3.60 | 2.25 | 3.60 | 2.25 | 3.60 |
| Blood, dried, f.o.b., NY unit | ... | 4.10 | 3.90 | 4.30 | 2.50 | 4.25 |
| Chicago, high grade unit | ... | 3.75 | 3.75 | 4.65 | 2.90 | 4.50 |
| Imported shipt unit | ... | 3.90 | 3.90 | 4.10 | 2.60 | 3.75 |
| Blues, Bronze Chinese Milori | | | | | | |
| Prussian Soluble lb. | .36 | .37 | .36 | .37 | .37 | .38½ |
| Ultramarine,* dry, wks, bbls lb. | ... | .10 | ... | .10 | ... | .10 |
| Regular grade, group 1 lb. | ... | .15 | ... | .15 | ... | .15 |
| Special, group 1 lb. | ... | .18 | ... | .18 | ... | .18 |
| Pulp, No. 1 lb. | ... | .26 | ... | .26 | ... | .26 |
| Bone, 4½ + 50% raw, Chicago ton | 28.00 | 30.00 | 26.00 | 28.00 | 20.00 | 25.00 |
| Bone Ash, 100 lb kgs lb. | .06 | .07 | .06 | .07 | .06 | .07 |
| Black, 200 lb bbls lb. | .06½ | .08¼ | .05½ | .08¼ | .05½ | .08¼ |
| Meal, 3% & 50%, imp ton | | 26.00 | 25.00 | 26.25 | 23.00 | 26.00 |
| Domestic, bgs, Chicago ton | 21.00 | 23.00 | 19.00 | 23.00 | 16.00 | 20.00 |
| Borax, tech, gran, 80 ton lots, sacks, delv ton *i* | ... | 40.00 | ... | 40.00 | ... | 40.00 |
| bbls, delv ton *i* | ... | 50.00 | ... | 50.00 | ... | 50.00 |
| c-l, sacks, delv ton *i* | ... | 44.00 | ... | 44.00 | ... | 44.00 |
| c-l, bbls, delv ton *i* | ... | 54.00 | ... | 54.00 | ... | 54.00 |
| Tech, powd, 80 ton lots, sacks ton *i* | ... | 45.00 | ... | 45.00 | ... | 45.00 |
| bbls, delv ton *i* | ... | 56.00 | ... | 56.00 | ... | 56.00 |
| c-l, sacks, delv ton *i* | ... | 49.00 | ... | 49.00 | ... | 49.00 |
| c-l, bbls, delv ton *i* | ... | 59.00 | ... | 59.00 | ... | 59.00 |
| Bordeaux Mixture, consumers, East, c-l, tins, drs, cases lb. | .10½ | .11 | .10½ | .11 | .08 | .16 |
| Dealers, East, c-l lb. | .10 | .10½ | .10 | .10½ | .08½ | .16½ |

*h* Lowest price is for pulp, highest for high grade precipitated; *i* Crystals $6 per ton higher; USP, $15 higher in each case; * Freight is equalized in each case with nearest producing point.

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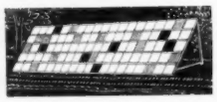

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**Bromine**
**Chromium Fluoride**

## *Prices*

| | | Current Market | | 1937 Low | 1937 High | 1936 Low | 1936 High |
|---|---|---|---|---|---|---|---|
| Bromine, cases | lb. | .30 | .43 | .30 | .43 | .30 | .43 |
| Bronze, Al, pwd, 300 lb drs | lb. | .80 | 1.50 | .80 | 1.50 | .80 | 1.50 |
| Gold, blk | lb. | .40 | .55 | .40 | .55 | .40 | .55 |
| Butanes, com 16-32* group 3 tks | lb. | .02¼ | .03¾ | .02¼ | .03¾ | ... | .04 |
| Butyl, Acetate, norm drs, frt allowed | lb. | .10 | .10½ | .10 | .10½ | .09½ | .12½ |
| tks, frt allowed | lb. | ... | .09 | ... | .09 | .08½ | .11 |
| Secondary, tks, frt allowed | lb. | ... | .07½ | ... | .07½ | .07½ | .096 |
| drs, frt, allowed | lb. | .08½ | .09 | .08½ | .09 | .106 | .111 |
| Aldehyde, 50 gal drs, wks | lb. | .16½ | .17½ | .16½ | .17½ | .19 | .21 |
| Carbinol, norm drs, wks | lb. | .60 | .75 | .60 | .75 | .60 | .75 |
| Lactate | lb. | .22½ | .23½ | .22½ | .23½ | .22½ | .23½ |
| Oleate, drs, frt allowed | lb. | ... | .25 | ... | .25 | ... | ... |
| Propionate, drs | lb. | .18 | .18½ | .18 | .18½ | .18 | .18½ |
| tks, delv | lb. | ... | .17 | ... | .17 | ... | .17 |
| Stearate, 50 gal drs | lb. | ... | .25 | ... | .25 | ... | .26 |
| Tartrate, drs | lb. | .55 | .60 | .55 | .60 | .55 | .60 |
| Butyraldehyde, drs, lcl, wks | lb. | ... | .35½ | ... | .35½ | ... | ... |
| Cadmium Metal | lb. | ... | 1.05 | ... | 1.05 | .75 | 1.05 |
| Sulfide, boxes | lb. | .90 | 1.00 | .90 | 1.00 | .90 | 1.10 |
| Calcium, Acetate, 150 lb bgs c-l, delv | 100 lb. | ... | 2.10 | ... | 2.10 | ... | 2.10 |
| Arsenate, jobbers, East of Rocky Mts, drs | lb. | .06 | .06¾ | .06 | .06¾ | .06 | .06¾ |
| dealers, drs | lb. | .06¼ | .07¾ | .06¼ | .07¾ | .06¼ | .07¾ |
| South, jobbers, drs | lb. | .06 | .06½ | .06 | .06½ | .06 | .06½ |
| dealers, drs | lb. | .06½ | .06¾ | .06½ | .06¾ | .06½ | .06¾ |
| Carbide, drs | lb. | .05 | .06 | .05 | .06 | .05 | .06 |
| Carbonate, tech, 100 lb bgs c-l | lb. | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Chloride, flake, 375 lb drs, c-l, delv | ton | ... | 22.00 | ... | 22.00 | ... | 22.00 |
| Solid, 650 lb drs, c-l, delv | ton | ... | 20.00 | ... | 20.00 | ... | 20.00 |
| Ferrocyanide, 350 lb bbls wks | lb. | ... | .17 | ... | .17 | ... | .17 |
| Gluconate, Pharm, 125 lb bbls | lb. | .50 | .57 | .50 | .57 | .50 | .57 |
| Nitrate, 100 lb bgs | ton | ... | 26.10 | ... | 26.10 | ... | 26.50 |
| Palmitate, bbls | lb. | .22 | .23 | .22 | .23 | .21 | .22 |
| Phosphate, tech, 450 lb bbls | lb. | .06½ | .07½ | .06½ | .07½ | .07½ | .08 |
| Resinate, precip, bbls | lb. | .13 | .14 | .13 | .14 | .13 | .14 |
| Stearate, 100 lb bbls | lb. | .19 | .21 | .19 | .21 | .18 | .21 |
| Camphor, slabs | lb. | ... | .55 | ... | .55 | .50 | .56 |
| Powder | lb. | ... | .55 | ... | .55 | .4940 | .56 |
| Camwood, Bk, ground bbls | lb. | .16 | .18 | .16 | .18 | .16 | .18 |
| Carbon Bisulfide, 500 lb drs | lb. | .05 | .05¾ | .05 | .05¾ | .05¼ | .08 |
| Black, c-l, bgs, delv, price varying with zone | lb. | .0445 | .0535 | .0445 | .0535 | .0445 | .0535 |
| lcl, bgs, delv, all zones | lb. | ... | .07 | ... | .07 | ... | .07 |
| cartons, delv | lb. | ... | .07¾ | ... | .07¾ | ... | .07¾ |
| cases, delv | lb. | ... | .08¼ | ... | .08¼ | ... | .08¼ |
| Decolorizing, drs, c-l | lb. | .08 | .15 | .08 | .15 | .08 | .15 |
| Dioxide, Liq 20-25 lb cyl | lb. | .06 | .08 | .06 | .08 | .06 | .08 |
| Tetrachloride, 1400 lb drs, delv | lb. | .05¼ | .06 | .05¼ | .06 | .05¾ | .06 |
| Casein, Standard, Dom, grd | lb. | .17 | .18 | .17 | .20¾ | .14½ | .20¾ |
| 80-100 mesh, c-l, bgs | lb. | .17½ | .18½ | .17½ | .21¼ | .15 | .21¼ |
| Castor Pomace, 5½ $NH_3$, c-l, bgs, wks | ton | ... | 23.00 | ... | 23.00 | 15.00 | 20.00 |
| Imported, ship, bgs | ton | ... | nom. | ... | nom. | 17.00 | 18.00 |
| Celluloid, Scraps, ivory cs | lb. | .12 | .15 | .12 | .15 | .17 | .18 |
| Transparent, cs | lb. | .12 | .13 | .12 | .13 | ... | .20 |
| Cellulose, Acetate, 50 lb kgs | lb. | ... | .40 | .40 | .55 | .55 | .60 |
| Chalk, dropped, 175 lb bbls | lb. | .03 | .03¾ | .03 | .03¾ | .03 | .03¾ |
| Precip, heavy, 560 lb cks | lb. | .03 | .04 | .03 | .04 | .03 | .04 |
| Light, 250 lb cks | lb. | .03 | .04 | .03 | .04 | .03 | .04 |
| Charcoal, Hardwood, lump, blk, wks | bu. | ... | .15 | ... | .15 | ... | .15 |
| Softwood, bgs, delv* | ton | 27.00 | 30.40 | 27.00 | 30.40 | 24.40 | 30.40 |
| Willow, powd, 100 lb bbl, wks | lb. | .06 | .06¼ | .06 | .06¼ | .06 | .06¼ |
| Chestnut, clarified bbls, wks | lb. | ... | .01625 | ... | .01625 | .01625 | .01⅞ |
| 25%, tks, wks | lb. | ... | .02 | ... | .02 | .01½ | .02 |
| Pwd, 60%, 100 lb bgs, wks | lb. | ... | .04⅞ | ... | .04⅞ | ... | .04⅞ |
| China Clay, c-l, blk mines | ton | ... | 6.50 | ... | 6.50 | ... | 7.00 |
| Imported, lump, blk | ton | 22.00 | 25.00 | 22.00 | 25.00 | 15.00 | 25.00 |
| Chlorine, cyls, lcl, wks, contract | lb. | .07½ | .08½ | .07½ | .08½ | .07½ | .08¼ |
| cyls, c-l, contract | lb. *j* | ... | .05½ | ... | .05½ | ... | .05½ |
| Liq, tk, wks, contract | 100 lb. | ... | 2.15 | ... | 2.15 | ... | 2.15 |
| Multi, c-l, cyls, wks, cont | lb. | 2.30 | 2.55 | 2.30 | 2.55 | 2.30 | 2.55 |
| Chloroacetophenone, tins, wks | lb. | 3.00 | 3.50 | 3.00 | 3.50 | ... | 3.00 |
| Chlorobenzene, Mono, 100 lb drs, lcl, wks | lb. | .06 | .07½ | .06 | .07½ | .06 | .07½ |
| Chloroform, tech, 1000 lb drs | lb. | .20 | .21 | .20 | .21 | .20 | .21 |
| USP, 25 lb tins | lb. | .30 | .31 | .30 | .31 | .30 | .31 |
| Chloropicrin; comml cyls | lb. | ... | .80 | ... | .80 | .85 | .90 |
| Chrome, Green, CP | lb. | .21 | .24 | .20 | .24 | .21½ | .23 |
| Yellow | lb. | .15½ | .16½ | .13 | .16½ | .11 | .14 |
| Chromium, Acetate, 8% Chrome, bbls | lb. | .05 | .08 | .05 | .08 | .06 | .08 |
| 20° soln, 400 lb bbls | lb. | ... | .05½ | ... | .05½ | ... | .05½ |
| Fluoride, powd, 400 lb bbl | lb. | .27 | .28 | .27 | .28 | .27 | .28 |

*j* A delivered price; * Depends upon point of delivery.

## *Current*

**Coal Tar Diphenylamine**

| | Current Market | 1937 Low | 1937 High | 1936 Low | 1936 High |
|---|---|---|---|---|---|
| Coal tar, bbls .....bbl. | 7.25 | 9.00 | 7.25 | 9.00 | 7.25 | 9.00 |
| Cobalt Acetate, bbls .....lb. | .58 | .60 | .58 | .60 | .58 | .60 |
| Carbonate tech, bbls ....lb. | ... | 1.50 | 1.42¾ | 1.50 | 1.35 | 1.48 |
| Hydrate, bbls .....lb. | ... | 1.60 | 1.60 | 1.76 | 1.66 | 1.76 |
| Linoleate, solid, bbls ...lb. | ... | .31 | .31 | .31¼ | .30 | .31¼ |
| Oxide, black, bgs .....lb. | 1.41 | 1.51 | 1.41 | 1.51 | 1.29 | 1.49 |
| Resinate, fused, bbls ...lb. | ... | .13 | ... | .13 | .12½ | .13 |
| Precipitated, bbls ....lb. | ... | .30½ | ... | .30½ | ... | .32 |
| Cochineal, gray or bk bgs..lb. | .32 | .36 | .32 | .36 | .32 | .36 |
| Teneriffe silver, bgs ....lb. | .33 | .37 | .33 | .37 | .33 | .37 |
| Copper, metal, electrol 100 lb. | . | 16.25 | 13.00 | 16.25 | 9.50 | 12.00 |
| Carbonate, 400 lb bbls ..lb. | .10½ | .12½ | .10½ | .12½ | ... | .08¼ |
| 52-54% bbls .....lb. | ... | .19 | .16¼ | .19 | .14½ | .16¼ |
| Chloride, 250 lb bbls ...lb. | .17 | .18 | .17 | .18 | .17 | .18 |
| Cyanide, 100 lb drs ....lb. | .37 | .38 | .37 | .38 | .37 | .38 |
| Oleate, precip, bbls .....lb. | ... | .20 | ... | .20 | ... | .20 |
| Oxide, black, bbls, wks..lb. | ... | nom. | .17½ | .18 | .14½ | .15¾ |
| red 100 lb bbls .....lb. | ... | nom. | .17 | .18 | .14 | .15 |
| Resinate, precip, bbls ...lb. | .18 | .19 | .18 | .19 | .18 | .19 |
| Stearate, precip, bbls ...lb. | .35 | .40 | .35 | .40 | .35 | .40 |
| Sub-acetate verdigris, 400 lb bbls .....lb. | .18 | .19 | .18 | .19 | .18 | .19 |
| Sulfate, bbls, c-l, wks 100 lb. | ... | 5.75 | 4.55 | 5.75 | 3.85 | 4.55 |
| Copperas, crys and sugar bulk c-l, wks .....ton | 12.00 | 13.00 | 12.00 | 13.00 | 13.00 | 16.00 |
| Corn Sugar, tanners, bbls 100 lb. | 3.89 | 3.99 | 3.74 | 3.99 | 3.08 | 4.03 |
| Corn Syrup, 42°, bbls..100 lb. | ... | 3.91 | 3.76 | 3.91 | 3.05 | 3.95 |
| 43°, bbls .....100 lb. | ... | 3.96 | 3.86 | 3.96 | 3.10 | 4.05 |
| Cotton, Soluble, wet, 100 lb bbls .....lb. | .40 | .42 | .40 | .42 | .40 | .42 |
| Cream Tartar, USP, powd & gran, 300 lb bbls .....lb. | ... | .15¾ | .15 | .15¾ | .15 | .16¾ |
| Creosote, USP, 42 lb cbys lb. | .45 | .47 | .45 | .47 | .45 | .47 |
| Oil, Grade 1, tks .....gal. | .13 | .13½ | .13 | .13½ | .12½ | .13½ |
| Grade 2 .....gal. | .113 | .12½ | .113 | .12½ | .109 | .12 |
| Cresol, USP, drs .....lb. | .10 | .10½ | .10 | .10½ | .10 | .10½ |
| Crotonaldehyde, 98%, drs, wks .....lb. | .26 | .30 | .26 | .30 | .26 | .30 |
| Cutch, Philippine, 100 lb bale lb. | .04 | .04¾ | .04 | .04¾ | .04 | .04¾ |
| Cyanamid, bgs, c-l, frt allowed Ammonia unit ..... | ... | 1.15 | 1.10 | 1.15 | 1.07½ | 1.10 |
| Derris root 5% rotenone, bbls .....lb. | .39 | .47 | .39 | .47 | ... | ... |
| Dextrin, corn, 140 lb bgs f.o.b., Chicago ...100 lb. | 4.45 | 4.65 | 4.35 | 4.65 | 3.45 | 5.00 |
| British Gum, bgs ...100 lb. | 4.70 | 4.90 | 4.60 | 4.90 | 3.70 | 5.40 |
| Potato, Yellow, 220 lb bgs lb. | .07¾ | .08¾ | .07¾ | .08¾ | .07¾ | .08¾ |
| White, 220 lb bgs, lcl lb. | .08 | .09 | .08 | .09 | .08 | .09 |
| Tapioca, 200 bgs, lcl ...lb. | ... | .08 | ... | .08 | ... | .08 |
| White, 140 lb bgs ..100 lb. | 4.30 | 4.58 | 4.30 | 4.58 | 3.40 | 4.95 |
| Diamylamine, c-l, drs, wks lb. | .47 | .75 | .47 | .75 | .75 | 1.00 |
| Diamylene, drs, wks .....lb. | .095 | .102 | .095 | .102 | .095 | .102 |
| tks, wks .....lb. | ... | .08½ | ... | .08½ | ... | .08½ |
| Diamylether, wks, drs ....lb. | .085 | .092 | .085 | .092 | .085 | .092 |
| tks, wks .....lb. | ... | .075 | ... | .075 | ... | .075 |
| Oxalate, lcl, drs, wks ..lb. | ... | .30 | ... | .30 | ... | ... |
| Diamylphthalate, drs, wks lb. | .19 | .19½ | .19 | .19½ | .18 | .19½ |
| Diamyl Sulfide, drs, wks ..lb. | ... | 1.10 | ... | 1.10 | ... | 1.10 |
| Dianisidine, bbls .....lb. | 2.25 | 2.45 | 2.25 | 2.45 | 2.25 | 2.45 |
| Dibutyl Ether, drs, wks, lcl lb. | ... | .30 | ... | .30 | ... | ... |
| Dibutylphthalate, drs, wks, frt allowed .....lb. | .19½ | .20 | .19½ | .20 | .18 | .21 |
| Dibutyltartrate, 50 gal drs lb. | ... | .50 | ... | .50 | .35 | .40 |
| Dichlorethylene, drs .....gal. | .29 | ... | .29 | ... | .29 | ... |
| Dichloroethylether, 50 gal drs, wks .....lb. | .15 | .16 | .15 | .16 | .16 | .17 |
| tks, wks .....lb. | ... | .14 | ... | .14 | ... | .15 |
| Dichloromethane, drs, wks lb. | ... | .23 | ... | .23 | ... | .23 |
| Dichloropentanes, drs, wks lb. | no prices | | no prices | | .032 | .040 |
| tks, wks .....lb. | no prices | | no prices | | ... | .02½ |
| Diethanolamine, tks, wks..lb. | .31 | .35 | .31 | .35 | ... | .30 |
| Diethylamine, 400 lb drs ..lb. | 2.75 | 3.00 | 2.75 | 3.00 | 2.75 | 3.00 |
| Diethylaniline, 850 lb drs..lb. | .50 | .52 | .50 | .52 | .50 | .55 |
| Diethyl Carbinol, drs .....lb. | .60 | .75 | .60 | .75 | .60 | .75 |
| Diethylcarbonate, com drs lb. | .31⅜ | .35 | .31⅜ | .35 | .31⅜ | .35 |
| 90% grade, drs .....lb. | ... | .25 | ... | .25 | ... | .25 |
| Diethylorthotoluidin, drs ..lb. | .64 | .67 | .64 | .67 | .64 | .67 |
| Diethylphthalate, 1000 lb drs lb. | .18 | .18½ | .18 | .18½ | .18 | .19 |
| Diethylsulfate, tech, drs, wks, lcl .....lb. | ... | .20 | ... | .20 | ... | .20 |
| Diethyleneglycol, drs .....lb. | .16½ | .17½ | .16½ | .17½ | .15½ | .17½ |
| Mono ethyl ethers, drs..lb. | .16 | .17 | .16 | .17 | .15 | .17 |
| tks, wks .....lb. | ... | .15 | ... | .15 | ... | .15 |
| Mono butyl ether, drs ..lb. | ... | .26 | ... | .26 | ... | .26 |
| Diethylene oxide, 50 gal drs, wks .....lb. | .20 | .24 | .20 | .24 | .20 | .24 |
| Diglycol Oleate, bbls .....lb. | ... | .21 | .21 | .24 | ... | .24 |
| Laurate, bbls .....lb. | ... | .27½ | ... | ... | ... | ... |
| Stearate, bbls .....lb. | ... | .27½ | ... | ... | ... | ... |
| Dimethylamine, 400 lb drs, pure 25 & 40% sol 100% basis .....lb. | ... | 1.00 | ... | .95 | ... | .95 |
| Dimethylaniline, 340 lb drs lb. | .26 | .27 | .26 | .27 | .26 | .30 |
| Dimethyl Ethyl Carbinol, drs lb | .60 | .75 | .60 | .75 | .60 | .75 |
| Dimethyl phthalate, drs, wks, frt allowed .....lb. | .20½ | .21 | .20½ | .21 | .19½ | .21½ |
| Dimethysulfate, 100 lb drs lb. | .45 | .50 | .45 | .50 | .45 | .50 |
| Dinitrobenzene, 400 lb bbls lb. *k* | .16 | .19 | .16 | .19 | .16 | .19½ |
| Dinitrochlorobenzene, 400 lb bbls .....lb. | .16½ | .17½ | .16 | .17½ | .14 | .15½ |
| Dinitronaphthalene, 350 lb bbls .....lb. | .35 | .38 | .35 | .38 | .34 | .37 |
| Dinitrophenol, 350 lb bbls lb. | .23 | .24 | .23 | .24 | .23 | .24 |
| Dinitrotoluene, 300 lb bbls lb. | .14½ | .15½ | .14½ | .15½ | .14½ | .16½ |
| Diphenyl, bbls .....lb. | .15 | .25 | .15 | .25 | .15 | .25 |
| Diphenylamine .....lb. | .31 | .32 | .31 | .32 | .31 | .32 |

*k* Higher price is for purified material.


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**Diphenylguanidine**
**Glue, Casein**

## Prices

| | Current Market | 1937 Low | 1937 High | 1936 Low | 1936 High |
|---|---|---|---|---|---|
| Diphenylguanidine, 100 lb drs ....lb. | .35 | .37 | .35 | .37 | .35 | .37 |
| Dip Oil, see Tar Acid Oil. | | | | | | |
| Divi Divi pods, bgs shipmt ....ton | 34.00 | nom. | 34.00 | nom. | 32.00 | 45.00 |
| Extract ....lb. | .05 | .05½ | .05 | .05½ | .05 | .05½ |
| **EGG YOLK** | | | | | | |
| Egg Yolk, dom., 200 lb cases ....lb. | .68 | nom. | .68 | nom. | .63 | .68 |
| Imported ....lb. | .53 | .56 | .53 | .56 | .48 | .56 |
| Epsom Salt, tech, 300 lb bbls c-l NY ....100 lb. | 1.80 | 2.00 | 1.80 | 2.00 | 1.80 | 2.00 |
| USP, c-l, bbls ....100 lb. | ... | 2.00 | ... | 2.00 | ... | 2.00 |
| Ether, USP anaesthesia 55 lb drs ....lb. | .22 | .23 | .22 | .23 | .22 | .23 |
| (Conc) ....lb. | .09 | .10 | .09 | .10 | .09 | .10 |
| Isopropyl 50 gal drs ....lb. | .07 | .08 | .07 | .08 | .07 | .08 |
| tks, frt allowed ....lb. | ... | .06 | ... | .06 | ... | .06 |
| Nitrous, conc, bottles ...lb. | .75 | .77 | .75 | .77 | .75 | .77 |
| Synthetic, wks, drs ....lb. | .08 | .09 | .08 | .09 | .08 | .09 |
| Ethyl Acetate, 85% Ester tks, frt alld ....lb. | ... | .06½ | ... | .06½ | .06½ | .08 |
| drs, frt alld ....lb. | ... | .07½ | ... | .07½ | .07½ | .09 |
| 95%, tks, frt allowed..lb. | ... | .06¾ | ... | .06¾ | .07 | .08½ |
| drs, frt alld ....lb. | ... | .07¾ | ... | .07¾ | .08 | .10 |
| Acetoacetate, 110 gal drs lb. | ... | .27½ | ... | .27½ | .37 | .68 |
| Benzylaniline, 300 lb drs lb. | .86 | .88 | .86 | .88 | .86 | .88 |
| Bromide, tech, drs ....lb. | .50 | .55 | .50 | .55 | .50 | .55 |
| Chloride, 200 lb drs ....lb. | .22 | .24 | .22 | .24 | .22 | .24 |
| Chlorocarbonate, cbys ...lb. | ... | .30 | ... | .30 | ... | .30 |
| Crotonate, drs ....lb. | 1.00 | 1.25 | 1.00 | 1.25 | 1.00 | 1.25 |
| Ether, Absolute, 50 gal drs lb. | .50 | .52 | .50 | .52 | .50 | .52 |
| Formate, drs, frt allowed lb. | ... | .31 | ... | .31 | ... | ... |
| Lactate, drs, wks ....lb. | ... | .33 | ... | .33 | .25 | .29 |
| Methyl Ketone, 50 gal drs, frt allowed ....lb. | .07 | .07½ | .07 | .07½ | .07 | .09 |
| tks, frt allowed ....lb. | ... | .06½ | ... | .06½ | .06½ | .07½ |
| Oxalate, drs, wks ....lb. | .30 | .34 | .30 | .34 | .37½ | .55 |
| Oxybutyrate, 50 gal drs, wks ....lb. | .30 | .30½ | .30 | .30½ | .30 | .30½ |
| Silicate, drs, wks ....lb. | ... | .77 | ... | .77 | ... | ... |
| Ethylene Dibromide, 60 lb drs ....lb. | .65 | .70 | .65 | .70 | .65 | .70 |
| Chloryhdrin, 40%, 10 gal cbys chloro, cont ....lb. | .75 | .85 | .75 | .85 | .75 | .85 |
| Anhydrous ....lb. | ... | .75 | ... | .75 | ... | .75 |
| Dichloride, 50 gal drs, wks lb. | .0545 | .0994 | .0545 | .0994 | .0545 | .0994 |
| Glycol, 50 gal drs, wks lb. | .17 | .21 | .17 | .21 | .17 | .21 |
| tks, wks ....lb. | ... | .16 | ... | .16 | ... | .16 |
| Mono Butyl Ether, drs, wks ....lb. | .20 | .21 | .20 | .21 | .20 | .21 |
| tks, wks ....lb. | ... | .19 | ... | .19 | ... | .19 |
| Mono Ethyl Ether, drs, wks ....lb. | .16 | .17 | .16 | .17 | .16 | .17 |
| tks, wks ....lb. | ... | .15 | ... | .15 | ... | .15 |
| Mono Ethyl Ether Acetate, drs, wks ....lb. | ... | .14 | ... | .14 | .14 | .18½ |
| tks, wks ....lb. | ... | .13 | ... | .13 | .13 | .16½ |
| Mono, Methyl Ether, drs wks ....lb. | .18 | .22 | .18 | .22 | .19 | .23 |
| tks, wks ....lb. | ... | .17 | ... | .17 | ... | .18 |
| Oxide, cyl ....lb. | .50 | .55 | .50 | .55 | .50 | .60 |
| Ethylidenaniline ....lb. | .45 | .47½ | .45 | .47½ | .45 | .47½ |
| Feldspar, blk pottery ....ton | ... | 14.50 | ... | 14.50 | ... | 14.50 |
| Powd, blk, wks ....ton | 14.00 | 14.50 | 14.00 | 14.50 | 14.00 | 14.50 |
| Ferric Chloride, tech, crys, 475 lb bbls ....lb. | .05 | .07½ | .05 | .07½ | .05 | .07½ |
| sol, 42° cbys ....lb. | .06¼ | .06½ | .06¼ | .06½ | .06¼ | .06½ |
| Fish Scrap, dried, unground, wks ....unit *l* | ... | 3.75 | ... | 3.75 | 2.50 | 3.50 |
| Acid, Bulk, 6 & 3%, delv Norfolk & Baltimore basis ....unit *m* | ... | 3.15 | ... | 3.15 | ... | 2.25 |
| Fluorspar, 98%, bgs ....lb. | no prices | | no prices | | 30.00 | 35.50 |
| Formaldehyde, USP, 400 lb bbls, wks ....lb. | .05¾ | .06¼ | .05¾ | .06¼ | .05¾ | .07 |
| Fossil Flour ....lb. | .02½ | .04 | .02½ | .04 | .02½ | .04 |
| Fullers Earth, blk, mines..ton | 6.50 | 15.00 | 6.50 | 15.00 | 6.50 | 15.00 |
| Imp powd, c-l, bgs ton | 23.00 | 30.00 | 23.00 | 30.00 | 23.00 | 30.00 |
| Furfural (tech) drs, wks .lb. | .10 | .15 | .10 | .15 | .10 | .15 |
| Furfuramide (tech) 100 lb drs ....lb. | ... | .30 | ... | .30 | ... | .30 |
| Fusel Oil, 10% impurities lb. | .16 | .18 | .16 | .18 | .16 | .18 |
| Fustic, crystals, 100 lb boxes ....lb. | .20 | .23 | .20 | .23 | .20 | .23 |
| Liquid 50°, 600 lb bbls..lb. | .08½ | .12 | .08½ | .12 | .08½ | .12 |
| Solid, 50 lb boxes ....lb. | .16 | .18 | .16 | .18 | .16 | .18 |
| **G SALT PASTE** | | | | | | |
| G Salt paste, 360 lb bbls...lb. | .45 | .47 | .45 | .47 | .45 | .47 |
| Gall Extract ....lb. | .19 | .20 | .19 | .20 | .18 | .20 |
| Gambier, com 200 lb bgs..lb. | ... | nom. | ... | nom. | ... | .06 |
| Singapore cubes, 150 lb bgs ....100 lb. | .09½ | .10½ | .09½ | .10½ | .08 | .09 |
| Gelatin, tech, 100 lb cs ...lb. | .50 | .55 | .50 | .55 | .50 | .55 |
| Glauber's Salt, tech, c-l, bgs, wks* ....100 lb. | .95 | 1.15 | .95 | 1.15 | .95 | 1.30 |
| Anhydrous, see Sodium Sulfate. | | | | | | |
| Glue, bone, com grades, c-l bgs ....lb. | .11 | .17½ | .11 | .17½ | .10½ | .17½ |
| Better grades, c-l, bgs lb. | .12½ | .17½ | .12½ | .17½ | .12 | .17½ |
| Casein, kgs ....lb. | .18 | .22 | .18 | .22 | .18 | .22 |

*l* + 10; *m* + 50; *Bbls. are 20c higher.

| | | Current Market | 1937 Low | 1937 High | 1936 Low | 1936 High |
|---|---|---|---|---|---|---|
| Glycerin, CP, 550 lb drs | lb. | ... | .29 | ... | .29 | .16 · .21½ |
| Dynamite, 100 lb drs | lb. | ... | .29 | ... | .29 | .13¾ .21½ |
| Saponification, drs | lb. | .23 | .23½ | .23 | .29 | .10¼ .22 |
| Soap Lye, drs | lb. | .22 | .22½ | .22 | .27 | .09¼ .20 |
| Glyceryl Bori-Borate, bbls | lb. | ... | .40 | ... | ... | ... ... |
| Monoricinoleate, bbls | lb. | ... | .27 | ... | ... | ... ... |
| Monostearate, bbls | lb. | ... | .30 | ... | ... | ... ... |
| Oleate, bbls | lb. | ... | .22 | ... | ... | ... ... |
| Phthalate | lb. | ... | .37 | .29 | .37 | .28 .29 |
| **Glyceryl Stearate, bbls** | **lb.** | ... | .18 | ... | .18 | ... .18 |
| Glycol Bori-Borate, bbls | lb. | ... | .26 | ... | ... | ... ... |
| Phthalate, drs | lb. | ... | .40 | .29 | .40 | .29 .35 |
| Stearate, drs | lb. | ... | .27½ | .23 | .27½ | ... .23 |
| **GUMS** | | | | | | |
| Gum Aloes, Barbadoes | lb. | .85 | .90 | .85 | .90 | .85 .90 |
| Arabic, amber sorts | lb. | .10½ | .11 | .10½ | .11 | .09 .10¾ |
| White sorts, No. 1, bgs | lb. | .27 | .28 | .27 | .28 | .25 .28 |
| No. 2, bgs | lb. | .25 | .26 | .25 | .26 | .24 .26 |
| Powd, bbls | lb. | .14 | .15 | .14 | .15 | .13 .14 |
| Asphaltum, Barbadoes (Manjak) 200 lb bgs, f.o.b., NY | lb. | .02½ | .10½ | .02½ | .10½ | .02½ .10½ |
| California, f.o.b., NY, drs | ton | 29.00 | 55.00 | 29.00 | 55.00 | 29.00 55.00 |
| Egyptian, 200 lb cases, f.o.b., NY | lb. | .12 | .15 | .12 | .15 | .12 .15 |
| Benzoin Sumatra, USP, 120 lb cases | lb. | .18 | .19 | .18 | .19 | .15 .19 |
| Copal, Congo, 112 lb bgs, clean, opaque | lb. | ... | .18⅞ | ... | .18⅞ | .18½ .20 |
| Dark amber | lb. | ... | .06⅞ | ... | .06⅞ | .06⅞ .08 |
| Light amber | lb. | ... | .10¼ | ... | .10¼ | .10¼ .14⅛ |
| Copal, East India, 180 lb bgs | | | | | | |
| Macassar pale bold | lb. | ... | .13 | ... | .13 | .12⅝ .14 |
| Chips | lb. | ... | .06½ | ... | .06½ | .06⅛ .06½ |
| Dust | lb. | .03⅝ | .04⅛ | .03⅝ | .04⅛ | .03⅝ .04⅛ |
| Nubs | lb. | ... | .11¼ | ... | .11¼ | .10⅜ .11⅛ |
| Singapore, Bold | lb. | ... | .15⅝ | ... | .15⅝ | .15⅛ .16⅞ |
| Chips | lb. | ... | .05 | ... | .05 | .04⅜ .05¼ |
| Dust | lb. | .03⅝ | .04⅛ | .03⅝ | .04⅛ | .03⅝ .04⅛ |
| Nubs | lb. | ... | .10¾ | ... | .10¾ | .10 .11¼ |
| Copal Manilla, 180-190 lb baskets, Loba A | lb. | ... | .09¾ | ... | .09¼ | .09¼ .13 |
| Loba B | lb. | ... | .09¼ | ... | .09¼ | .08⅞ .12 |
| Loba C | lb. | ... | .08⅞ | ... | .08⅞ | .08⅜ .11⅛ |
| DBB | lb. | ... | .08⅜ | .08 | .08⅜ | .07⅝ .08⅞ |
| Dust | lb. | ... | .06⅛ | .05¾ | .06⅛ | .05 .06⅛ |
| MA sorts | lb. | ... | .07¼ | .06¾ | .07¼ | .06¾ .07⅝ |
| Copal Pontianak, 224 lb cases, bold genuine | lb. | ... | .16 | .15½ | .16 | .14¼ .16 |
| Chips | lb. | ... | .10¾ | .09⅛ | .11⅛ | .07 .08½ |
| Mixed | lb. | ... | .14 | .13½ | .14 | .13¼ .13¾ |
| Nubs | lb. | ... | .12⅞ | .12¾ | .13½ | .10¼ .12 |
| Split | lb. | ... | .14⅛ | .13½ | .14⅛ | .12¾ .13 |
| Dammar Batavia, 136 lb cases | | | | | | |
| A | lb. | ... | .23½ | ... | .23½ | .21⅜ .22¼ |
| B | lb. | ... | .22⅛ | ... | .22⅛ | .20⅜ .21½ |
| C | lb. | ... | .18½ | ... | .18½ | .16½ .17⅜ |
| D | lb. | ... | .15¼ | .15¼ | .15⅝ | .13⅝ .14⅜ |
| A/D | lb. | ... | .17⅝ | .17⅝ | .18½ | .15½ .17⅛ |
| A/E | lb. | ... | .14⅞ | .14⅞ | .15¼ | .12⅞ .14½ |
| E | lb. | ... | .08⅛ | .07½ | .08⅛ | .06¾ .07⅛ |
| F | lb. | ... | .06¼ | ... | .06¼ | .05⅞ .06⅞ |
| Singapore, No. 1 | lb. | ... | .18 | .17⅛ | .18 | .16¼ .17½ |
| No. 2 | lb. | ... | .15 | .14⅛ | .15 | .13 .14¼ |
| No. 3 | lb. | ... | .05¾ | ... | .05¾ | .05¼ .05¾ |
| Chips | lb. | ... | .10⅞ | .10¼ | .10⅞ | .09¾ .09¾ |
| Dust | lb. | ... | .05¾ | .05¾ | .06 | .04¼ .05⅝ |
| Seeds | lb. | ... | .08½ | .07⅞ | .08½ | .06⅝ .07⅜ |
| Elemi, cons | lb. | .09⅜ | .09½ | .09⅜ | .10¼ | .09¾ .10¼ |
| Ester | lb. | .11½ | .12 | .11½ | .12 | .07⅝ .10 |
| Gamboge, pipe, cases | lb. | .58 | .59 | .58 | .59 | .58 .59 |
| Powd, bbls | lb. | .65 | .66 | .65 | .66 | .65 .66 |
| Ghatti, sol. bgs | lb. | .11 | .15 | .11 | .15 | .11 .15 |
| Karaya, powd, bbls, xxx | lb. | .24 | .25 | .24 | .25 | .24 .25 |
| xx | lb. | .16 | .17 | .16 | .17 | .16 .17 |
| No. 1 | lb. | .09½ | .10 | .09½ | .10 | .09½ .10 |
| No. 2 | lb. | .08½ | .09 | .08½ | .09 | .08½ .09 |
| Kauri, NY, San Francisco, Brown XXX, cases | lb. | .60 | .60½ | .60 | .60½ | .60 .60½ |
| BX | lb. | ... | .36 | .33 | .36 | .33 .33½ |
| B1 | lb. | ... | .26 | .21 | .26 | .19 .21 |
| B2 | lb. | ... | .21 | .15½ | .21 | .14½ .15½ |
| B3 | lb. | ... | .17½ | .12 | .17½ | .12 .12½ |
| Pale XXX | lb. | .65 | .65½ | .65 | .65½ | .65 .65½ |
| No. 1 | lb. | ... | .41 | .40 | .41 | .40 .40½ |
| No. 2 | lb. | ... | .24 | .22 | .24 | .22 .22½ |
| No. 3 | lb. | ... | .14¾ | .15 | .14¾ | .15 .15½ |
| Kino, tins | lb. | .70 | .80 | .70 | .80 | .70 .80 |
| Mastic | lb. | .57 | .58 | .57 | .58 | .56 .60½ |
| Sandarac, prime quality, 200 lb bgs & 300 lb cks | lb. | .33 | .35 | .33 | .35 | .19½ .38 |
| Senegal, picked bgs | lb. | .20 | .21 | .20 | .21 | .20 .21 |
| Sorts | lb. | .10½ | .11 | .09¾ | .11 | .09¾ .12½ |
| Thus, bbls | 280 lbs. | ... | 13.00 | 12.00 | 13.00 | 11.00 12.00 |
| Strained | 280 lbs. | ... | 13.00 | 12.00 | 13.00 | 11.00 12.00 |
| Tragacanth, No. 1, cases | lb. | 2.75 | 2.80 | 2.40 | 2.80 | 1.20 2.50 |
| No. 2 | lb. | 2.35 | 2.40 | 2.00 | 2.40 | 1.10 2.10 |
| No. 3 | lb. | 2.30 | 2.35 | 1.95 | 2.35 | .95 2.05 |
| No. 4 | lb. | 2.25 | 2.30 | 1.85 | 2.30 | .85 1.95 |
| No. 5 | lb. | 2.00 | 2.05 | 1.65 | 2.05 | .75 1.75 |
| Yacca, bgs | lb. | .03¼ | .03¾ | .03¼ | .03¾ | .03¼ .03¾ |
| Helium, cyl (200 cu. ft.) | cyl. | ... | 25.00 | ... | 25.00 | ... 25.00 |
| Hematine crystals, 400 lb bbls | lb. | .16 | .18 | .16 | .18 | .16 .18 |
| Hemlock, 25%, 600 lb bbls, wks | lb. | ... | .03⅛ | ... | .03⅛ | ... .02⅞ |
| tks | lb. | ... | .02¾ | ... | .02¾ | ... .02½ |


use

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BENZOIC ACID
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BENZOYL CHLORIDE
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# Prices

| | | Current Market | 1937 Low | 1937 High | 1936 Low | 1936 High |
|---|---|---|---|---|---|---|
| Hexalene, 50 gal drs, wks | lb. | ... | .30 | ... | .30 | ... | .30 |
| Hexane, normal 60-70° C. Group 3, tks | gal. | ... | .10½ | ... | .10½ | ... | .12 |
| Hexamethylenetetramine, powd, drs | lb. | .35 | .36 | .35 | .36 | .35 | .39 |
| Hexyl Acetate, delv, drs | lb. | ... | .10 | ... | .10 | .10 | .12½ |
| tks | lb. | ... | .09 | ... | .09 | .09 | .11½ |
| Hoof Meal, f.o.b. Chicago unit | | ... | 3.65 | 3.50 | 3.65 | 2.35 | 3.00 |
| Hydrogen Peroxide, 100 vol, 140 lb cbys | lb. | .20 | .21 | .20 | .21 | .20 | .21 |
| Hydroxyamine Hydrochloride | lb. | ... | 3.15 | ... | 3.15 | ... | 3.15 |
| Hypernic, 51°, 600 lb bbls | lb. | .15 | .20 | .15 | .20 | .17 | .20 |

## INDIGO

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Indigo, Bengal, bbls | lb. | ... | 2.40 | ... | 2.40 | ... | ... |
| Synthetic, liquid | lb. | .16½ | .19 | .16½ | .19 | .13 | .14 |
| Iodine, Resublimed, kgs | lb. | 1.50 | 1.60 | 1.50 | 1.60 | 1.50 | 1.75 |
| Irish Moss, ord, bales | lb. | .11 | .12 | .11 | .12 | .09 | .10 |
| Bleached, prime, bales | lb. | .20 | .21 | .20 | .21 | .18 | .19 |
| Iron Acetate Liq. 17°, bbls | lb. | .03 | .04 | .03 | .04 | .03 | .04 |
| Chloride see Ferric Chloride. | | | | | | | |
| Nitrate, coml, bbls | 100 lb. | 2.75 | 3.25 | 2.75 | 3.25 | 2.75 | 3.25 |
| Isobutyl Carbinol (128-132°C) drs, wks | lb. | .33 | .34 | .33 | .34 | .33 | .34 |
| tks, wks | lb. | ... | .32 | ... | .32 | ... | .32 |
| Isopropyl Acetate, tks, frt allowed | lb. | ... | .06½ | ... | .06½ | .06 | .07½ |
| drs, frt allowed | lb. | .07½ | .08 | .07½ | .08 | .07 | .09 |
| Ether, see Ether, isopropyl. | | | | | | | |
| Keiselguhr, 95 lb bgs, NY, Brown | ton | 60.00 | 70.00 | 60.00 | 70.00 | 60.00 | 70.00 |

## LEAD ACETATE

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Lead Acetate, f.o.b. NY, bbls, White, broken | lb. | ... | .13½ | .11½ | .13½ | .11 | .11½ |
| cryst, bbls | lb. | ... | .13½ | .11½ | .13½ | .10½ | .11½ |
| gran, bbls | lb. | ... | .14¼ | .12¼ | .14¼ | .11 | .12¼ |
| powd, bbls | lb. | ... | .14¼ | .12¼ | .14¼ | .11¼ | .12¼ |
| Arsenate, East, drs | lb. | ... | .11½ | .11 | .11½ | .09 | .10 |
| West, drs | lb. | ... | .12½ | .11 | .12½ | .09 | .09¾ |
| Linoleate, solid, bbls | lb. | ... | .18 | ... | .18 | .18 | .26½ |
| Metal, c-l, NY | 100 lb. | 6.95 | 7.05 | 6.00 | 7.05 | 4.50 | 6.00 |
| Nitrate, 500 lb bbls, wks | lb. | .09 | .09½ | .09 | .09½ | .09 | .09½ |
| Oleate, bbls | lb. | .15 | .16 | .15 | .16 | .15 | .16 |
| Red, dry, 95% $Pb_2O_4$, delv | lb. | ... | .0945 | .08½ | .0945 | .07 | .085 |
| 97% $Pb_2O_4$, delv | lb. | ... | .09¾ | .08¾ | .09¾ | .07¼ | .08¾ |
| 98% $Pb_2O_4$, delv | lb. | ... | .10 | .09 | .10 | .07½ | .09 |
| Resinate, precip, bbls | lb. | ... | .16½ | .14 | .16½ | ... | .14 |
| Stearate, bbls | lb. | .22 | .23 | .22 | .23 | .22 | .23 |
| Titanate, bbls, c-l, f.o.b. wks, frt allowed | lb. | ... | .10 | ... | .10 | ... | ... |
| White, 500 lb bbls, wks | lb. | ... | .09 | .07¼ | .09 | .06½ | .07¼ |
| Basic sulfate, 500 lb bbls, wks | lb. | ... | .08¾ | .06¾ | .08¾ | .06 | .06½ |
| Lime, chemical quicklime, f.o.b., wks, bulk | ton | 6.00 | 8.00 | 6.00 | 8.00 | 7.00 | 7.25 |
| Hydrated, f.o.b., wks | ton | 8.00 | 12.00 | 8.00 | 12.00 | 8.50 | 12.00 |
| Lime Salts, see Calcium Salts. | | | | | | | |
| Lime sulfur, dealers, tks | gal. | ... | .11 | ... | .11 | ... | .11 |
| drs | gal. | .13 | .16 | .13 | .16 | .13 | .16 |
| Linseed Meal, bgs | ton | ... | 38.50 | 38.50 | 42.50 | 29.00 | 40.50 |
| Litharge, coml, delv, bbls | lb. | ... | .0845 | .07½ | .08½ | .06 | .075 |
| Lithopone, dom, ordinary, delv, bgs | lb. | .04¼ | .04½ | .04¼ | .04½ | .04¼ | .04¾ |
| bbls | lb. | .04½ | .04¾ | .04½ | .04¾ | .04½ | .05 |
| High strength, bgs | lb. | .05¾ | .06 | .05¾ | .06 | .05¾ | .06¼ |
| bbls | lb. | .06 | .06¼ | .06 | .06¼ | .06 | .06½ |
| Titanated, bgs | lb. | .05¾ | .06 | .05¾ | .06 | .05¾ | .06¼ |
| bbls | lb. | .06 | .06¼ | .06 | .06¼ | .06 | .06½ |
| Logwood, 51°, 600 lb bbls | lb. | .08½ | .10½ | .08½ | .10½ | .06½ | .10½ |
| Solid, 50 lb boxes | lb. | .13½ | .17½ | .13½ | .17½ | .13½ | .17½ |
| Sticks | ton | 24.00 | 25.00 | 24.00 | 25.00 | 24.00 | 26.00 |

## MADDER

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Madder, Dutch | lb. | .22 | .25 | .22 | .25 | .22 | .25 |
| Magnesite, calc, 500 lb bbl | ton | 60.00 | 65.00 | 60.00 | 65.00 | 60.00 | 65.00 |
| Magnesium Carb, tech, 70 lb bgs, wks | lb. | .06 | .06½ | .06 | .06½ | .06 | .06½ |
| Chloride flake, 375 lb drs, c-l, wks | ton | 39.00 | 42.00 | 39.00 | 42.00 | 36.00 | 42.00 |
| Fluosilicate, crys, 400 lb bbls, wks | lb. | .10 | .10½ | .10 | .10½ | .10 | .10½ |
| Oxide, USP, light, 100 lb bbls | lb. | .36 | .40 | .36 | .40 | ... | .42 |
| Heavy, 250 lb bbls | lb. | ... | .50 | ... | .50 | ... | .50 |
| Palmitate, bbls | lb. | .33 | nom. | .33 | nom. | .23 | .24 |
| Silicofluoride, bbls | lb. | .09½ | .10½ | .09½ | .10½ | ... | ... |
| Stearate, bbls | lb. | .21 | .24 | .21 | .24 | .20 | .24 |
| Manganese acetate, drs | lb. | .25½ | .26½ | .25½ | .26½ | ... | ... |
| Borate, 30%, 200 lb bbls | lb. | .15 | .16 | .15 | .16 | .15 | .16 |
| Chloride, 600 lb cks | lb. | .09 | .12 | .09 | .12 | .09 | .12 |
| Dioxide, tech (peroxide), paper bgs, c-l | ton | ... | 47.50 | ... | 47.50 | ... | 47.50 |
| Hydrate, bbls | lb. | ... | .80 | ... | .80 | ... | ... |
| Linoleate, liq, drs | lb. | .18 | .19¼ | .18 | .19¼ | ... | ... |
| solid, precip, bbls | lb. | .17½ | .19 | .17½ | .19 | ... | ... |
| Resinate, fused, bbls | lb. | .08¼ | .08½ | .08¼ | .08½ | ... | ... |
| precip, drs | lb. | ... | .12 | ... | .12 | ... | ... |
| Sulfate, tech, anhyd, 90-95%, 550 lb drs | lb. | .07 | .07½ | .07 | .07½ | ... | ... |
| Mangrove, 55%, 400 lb bbls | lb. | ... | .04 | ... | .04 | ... | .04 |
| Bark, African | ton | 26.00 | 27.00 | 26.00 | 27.00 | 25.50 | 27.00 |

| | | Current Market | 1937 Low | 1937 High | 1936 Low | 1936 High |
|---|---|---|---|---|---|---|
| Mannitol, pure cryst, cs, wks | lb. | 1.48 | ... | 1.48 | 1.48 | 1.60 |
| Marble Flour, blk | ton | 12.00 | 12.00 | 13.00 | 12.00 | 13.00 |
| Mercuric chloride | lb. | ... | ... | 1.20 | .81 | 1.20 |
| Mercury metal ...76 lb. flasks | | 92.00 | 92.00 | 95.00 | 73.50 | 95.00 |
| Meta-nitro-aniline | lb. | .67 | .67 | .69 | .67 | .69 |
| Meta-nitro-paratoluidine 200 lb bbls | lb. | 1.45 | 1.45 | 1.55 | 1.40 | 1.55 |
| Meta-phenylene-diamine 300 lb bbls | lb. | .80 | .80 | .84 | .80 | .84 |
| Meta-toluene-diamine, 300 lb bbls | lb. | .65 | .65 | .67 | .65 | .69 |
| Methanol, denat, grd, drs, c-l, frt all'd | gal. | ... | ... | .53 | ... | ... |
| contracts | gal. | ... | ... | .50 | ... | ... |
| tanks, frt all'd | gal. | ... | ... | .48 | ... | ... |
| contracts, frt all'd | gal. | ... | ... | .45 | ... | ... |
| Pure, drs, c-l, frt all'd | gal. | ... | ... | .38 | ... | ... |
| tanks | gal. | ... | ... | .33 | ... | ... |
| 95%, tks | gal. | ... | ... | .31 | ... | ... |
| 97%, tks | gal. | ... | ... | .32 | ... | ... |
| Methyl Acetate, dom, 98-100%, drs | lb. | .16 | .17½ | .16 | .17½ | .11 | .18½ |
| Acetone, frt all'd, drs gal. *p* | | .45½ | .58½ | .45½ | .58½ | .45½ | .68½ |
| tks, frt allowed, drs gal. *p* | | .41 | .44½ | .41 | .44½ | .41 | .48 |
| Synthetic, frt all'd, east of Rock M.. drs | gal. *p* | .52½ | .59½ | .52½ | .59½ | .52½ | .60 |
| tks, frt all'd | gal. | .48 | .49½ | .48 | .49½ | .48 | .53 |
| West of Rocky M, frt all'd, drs | gal. *p* | .55½ | .58 | .55½ | .58 | .55½ | .69 |
| tks, frt all'd | gal. *p* | ... | .51 | ... | .51 | .51 | .63½ |
| Anthraquinone | lb. | .65 | .67 | .65 | .67 | .65 | .67 |
| Butyl Ketone, tks | lb. | ... | .10½ | ... | .10½ | ... | .10½ |
| Chloride, 90 lb cyl | lb. | .37 | .43 | .37 | .43 | ... | .45 |
| Ethyl Ketone, tks | lb. | ... | .07½ | ... | .07½ | ... | .07½ |
| Formate, drs, frt allowed | lb. | ... | .39 | ... | .39 | ... | ... |
| Hexyl Ketone, pure, drs | lb. | ... | .60 | ... | .60 | ... | .60 |
| Lactate, drs, frt allowed | lb. | | .30 | ... | .30 | ... | ... |
| Propyl carbinol, drs | lb. | .60 | .75 | .60 | .75 | .60 | .75 |
| Mica, dry grd, bgs, wks | lb. | 35.00 | ... | 35.00 | ... | 35.00 | ... |
| Michler's Ketone, kgs | lb. | ... | 2.50 | ... | 2.50 | ... | 2.50 |
| Molasses, blackstrap, tks, f.o.b. NY | gal. | ... | .07¼ | ... | .07¼ | .07 | .08¼ |
| Monoamylamine, c-l, drs, wks | lb. | .52 | 1.00 | .52 | 1.00 | ... | 1.00 |
| Monochlorobenzene, see Chlorobenzene, mono. | | | | | | | |
| Monoethanolamine, tks, wks | lb. | ... | .30 | ... | .30 | ... | .30 |
| Monomethylamine, drs, frt all'd, E. Mississippi, c-l | lb. | ... | .65 | ... | .65 | ... | ... |
| Monomethylparaminosulfate, 100 lb drs | lb. | 3.75 | 4.00 | 3.75 | 4.00 | 3.75 | 4.00 |
| Myrobalans 25%, liq bbls | lb. | ... | .04¼ | ... | .04¼ | ... | .04¼ |
| 50% Solid, 50 lb boxes | lb. | .06 | .06¼ | .06 | .06¼ | .06 | .06¼ |
| J1 bgs | ton | ... | 26.50 | 26.50 | 28.00 | 22.00 | 26.50 |
| J2 bgs | ton | ... | 20.50 | 20.50 | 20.75 | 14.25 | 16.75 |
| R2 bgs | ton | ... | 20.00 | 20.00 | 20.25 | 14.00 | 16.25 |
| **NAPHTHA** | | | | | | | |
| Naphtha, v.m.&p. (deodorized) see petroleum solvents. | | | | | | | |
| Naphtha, Solvent, water-white, tks | gal. | ... | .31 | ... | .31 | ... | .31 |
| drs, c-l | gal. | ... | .36 | ... | .36 | ... | .36 |
| **NAPHTHALENE** | | | | | | | |
| Naphthalene, dom, crude, bgs, wks | lb. | 2.65 | 2.80 | 2.65 | 3.00 | 2.75 | 4.50 |
| Imported, cif, bgs | lb. | 2.65 | 2.65 | 2.80 | 3.00 | ... | ... |
| Balls, flakes, pks | lb. | ... | .08 | ... | .08 | .07¼ | .08 |
| Balls, ref'd, bbls, wks | lb. | ... | .07¼ | ... | .07¼ | .06¾ | .07¼ |
| Dyestuffs, bgs, bbls, wks | lb. | ... | .07¼ | ... | .07¼ | .06 | .07 |
| Flakes, ref'd, bbls, wks | lb. | ... | .07¼ | ... | .07¼ | .06¾ | .07¼ |
| Nickel Carbonate, bbls | lb. | ... | .36 | ... | .36 | ... | .36 |
| Chloride, bbls | lb. | .18 | .19 | .18 | .19 | .18 | .19 |
| Metal ingot | lb. | ... | .35 | ... | .35 | ... | .35 |
| Oxide, 100 lb kgs, NY | lb. | .35 | .37 | .35 | .37 | .35 | .37 |
| Salt, 400 lb bbls, NY | lb. | .13 | .13½ | .13 | .13½ | .13 | .13¼ |
| Single, 400 lb bbls, NY | lb. | .13 | .13½ | .13 | .13½ | .13 | .13½ |
| Nicotine, 40%, drs, sulfate, 55 lb drs | lb. | ... | .76 | ... | .76 | .75 | 1.17 |
| Nitre Cake, blk | ton | ... | 16.00 | ... | 16.00 | 12.00 | 14.00 |
| Nitrobenzene, redistilled, 1000 lb drs, wks | lb. | .08 | .10 | .08 | .10 | .08 | .11 |
| tks | lb. | ... | .07½ | ... | .07½ | ... | .08½ |
| Nitrocellulose, c-l-l c-l, wks | lb. | .22 | .29 | .26 | .29 | .26 | .34 |
| Nitrogenous Mat'l, bgs, imp | unit | no prices | | no prices | | 2.00 | 3.10 |
| dom, Eastern wks | unit | ... | 3.90 | 3.60 | 3.90 | 1.90 | 3.00 |
| dom, Western wks | unit | ... | 3.40 | 3.40 | 3.50 | 1.85 | 2.75 |
| Nitronaphthalene, 550 lb bbls | lb. | .24 | .25 | .24 | .25 | .24 | .25 |
| Nutgalls Alleppo, bgs | lb. | .20 | .22 | .20 | .22 | .16 | .18 |
| Chinese, bgs | lb. | .20 | .22 | .20 | .22 | .19 | .20 |
| **OAK BARK** | | | | | | | |
| Oak Bark Extract, 25%, bbls | lb. | ... | .03⅛ | ... | .03⅛ | ... | .03½ |
| tks | lb. | ... | .02¾ | ... | .02¾ | ... | .02¾ |
| Octyl Acetate, tks, wks | lb. | .16 | .17 | .16 | .17 | ... | .15 |
| Orange-Mineral, 1100 lb cks NY | lb. | ... | .12¾ | .11¼ | .12¾ | .10 | .11¼ |
| Orthoaminophenol, 50 lb kgs | lb. | 2.15 | 2.25 | 2.15 | 2.25 | 2.15 | 2.25 |
| Orthoanisidine, 100 lb drs | lb. | .70 | .74 | .70 | .74 | .82 | .84 |
| Orthochlorophenol, drs | lb. | .35 | .75 | .35 | .75 | .50 | .65 |
| Orthocresol, drs, wks | lb. | .13½ | .14½ | .13½ | .14½ | .13 | .15 |
| Orthodichlorobenzene, 1000 lb drs | lb. | .06 | .07 | .05 | .07 | .05 | .11½ |

*o* Country is divded in 4 zones, prices varying by zone; *p* Country is divided into 5 zones. Also see footnote directly above; *q* Naphthalene quoted on Pacific Coast F.A.S. Phila. or N. Y.

**TURNER** Chemicals are backed by 75 years of experience—insuring you a uniform product of the highest standard—yet priced to meet competition.

**Caustic Potash**

**Caustic Soda**

**Potassium Carbonate**

**Oxalic Acid**

**Sodium Chlorate**

**Bleaching Powder**

**Persulphate of Ammonia**

**Persulphate of Potash**

**Aluminum Stearate**

**Calcium Stearate**

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Phosphorus and phosphorus products. Sodium chlorate. Potassium perchlorate. Oxalic acid

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DIBUTYL PHTHALATE

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Subsidiary of the
AMERICAN COMMERCIAL ALCOHOL CORPORATION

**Orthonitrochlorobenzene**
**Phloroglucinol**

## Prices

| | Current Market | 1937 Low | 1937 High | 1936 Low | 1936 High |
|---|---|---|---|---|---|
| Orthonitrochlorobenzene, 1200 lb drs, wks ..... lb. | .28 | .29 | .28 | .29 | .28 | .29 |
| Orthonitroparachlorphenol, tins ..... lb. | .70 | .75 | .70 | .75 | .70 | .75 |
| Orthonitrophenol, 350 lb drs ..... lb. | .85 | .90 | .85 | .90 | .52 | .80 |
| Orthonitrotoluene, 1000 lb drs, wks ..... lb. | .07 | .10 | .07 | .10 | .07 | .10 |
| Orthotoluidine, 350 lb bbls, l-c-l ..... lb. | .14 | .15 | .14 | .15 | .14 | .15 |
| Osage Orange, cryst, bbls . lb. | .17 | .25 | .17 | .25 | .17 | .25 |
| 51° liquid ..... lb. | .07 | .08 | .07 | .08 | .07 | .07¾ |
| Paraffin, rfd, 200 lb cs slabs | | | | | | |
| 122-127° M P ..... lb. | .0445 | .04½ | .0445 | .04½ | .0445 | .04½ |
| 128-132° M P ..... lb. | .04¾ | .049 | .04¾ | .049 | .04¾ | .049 |
| 133-137° M P ..... lb. | .05½ | .05¾ | .05½ | .05¾ | .05½ | .05¾ |
| Para aldehyde, 110-55 gal drs ..... lb. | .16 | .18 | .16 | .18 | .16 | .18 |
| Aminoacetanilid, 100 lb kgs ..... lb. | ... | .85 | ... | .85 | ... | .85 |
| Aminohydrochloride, 100 lb kgs ..... lb. | 1.25 | 1.30 | 1.25 | 1.30 | 1.25 | 1.30 |
| Aminophenol, 100 lb kgs lb. | ... | 1.05 | ... | 1.05 | ... | 1.05 |
| Chlorophenol, drs ..... lb. | .30 | .45 | .30 | .45 | .50 | .65 |
| Dichlorobenzene, 200 lb drs, wks ..... lb. | .16 | .20 | .16 | .20 | .16 | .20 |
| Formaldehyde, drs, wks lb. | .34 | .35 | .34 | .35 | .34 | .39 |
| Nitroacetanilid, 300 lb bbls ..... lb. | .45 | .52 | .45 | .52 | .45 | .52 |
| Nitroaniline, 300 lb bbls, wks ..... lb. | .45 | .47 | .45 | .47 | .47 | .51 |
| Nitrochlorobenzene, 1200 lb drs, wks ..... lb. | .23½ | .24 | .23½ | .24 | .23½ | .24 |
| Nitro-orthotoluidine, 300 lb bbls ..... lb. | 2.75 | 2.85 | 2.75 | 2.85 | 2.75 | 2.85 |
| Nitrophenol, 185 lb bbls lb. | .35 | .37 | .35 | .37 | .45 | .50 |
| Nitrosodimethylaniline, 120 lb bbls ..... lb. | .92 | .94 | .92 | .94 | .92 | .94 |
| Nitrotoluene, 350 lb bbls lb. | ... | .35 | ... | .35 | .36 | .37 |
| Para Tertiary amyl phenol, wks, drs, c-l ..... lb. | ... | .26 | ... | .26 | .26 | .50 |
| Phenylenedamine, 350 lb bbls ..... lb. | 1.25 | 1.30 | 1.25 | 1.30 | 1.25 | 1.30 |
| Toluenesulfonamide, 175 lb bbls ..... lb. | .70 | .75 | .70 | .75 | .70 | .75 |
| tks, wks ..... lb. | ... | .31 | ... | .31 | ... | .31 |
| Toluenesulfonchloride, 410 lb bbls, wks ..... lb. | .20 | .22 | .20 | .22 | .20 | .22 |
| Toluidine, 350 lb bbls, wks ..... lb. | .56 | .58 | .56 | .58 | .56 | .60 |
| Paris Green, dealer, drs, frt E. of Cleveland ..... lb. | .22 | .24 | .22 | .24 | ... | .24 |
| Pentane, normal, 28-38° C, group 3, tks ..... gal. | ... | .09½ | ... | .09½ | .09 | .09½ |
| drs, group 3 ..... gal. | .12½ | .16 | .12½ | .16 | .10 | .16 |
| Perchlorethylene, 100 lb drs, frt allowed ..... lb. | ... | .10½ | ... | .10½ | .10½ | .15 |
| Petrolatum, dark amber, bbls ..... lb. | .02⅞ | .03 | .02⅝ | .03 | .02⅝ | .02⅞ |
| Light, bbls ..... lb. | .03⅛ | .03⅜ | .03⅛ | .03⅜ | .03⅛ | .03⅜ |
| Medium, bbls ..... lb. | .02⅞ | .03⅛ | .02⅞ | .03⅛ | .02⅞ | .03⅛ |
| Dark green, bbls ..... lb. | .02½ | .02¾ | .02½ | .02¾ | .02½ | .02¾ |
| Red, bbls ..... lb. | .02⅝ | .03¾ | .02⅛ | .03¾ | .02⅛ | .02⅝ |
| White, lily, bbls ..... lb. | .06 | .06¼ | .06 | .06¼ | .06 | .06¼ |
| White, snow, bbls ..... lb. | .07 | .07¼ | .07 | .07¼ | .07 | .07¼ |
| Petroleum Ether, 30-60°, group, 3 tks ..... gal. | ... | .13 | ... | .13 | ... | .13 |
| drs, group 3 ..... gal. | .15 | .16 | .15 | .16 | .15 | .16 |

### PETROLEUM SOLVENTS AND DILUENTS

| | | | | | | |
|---|---|---|---|---|---|---|
| Cleaners naphthas, group 3, tks, wks ..... gal. | .07⅜ | .07½ | .07⅜ | .07½ | .07⅜ | .07½ |
| Bayonne, tks, wks ... gal. | ... | .10 | .09½ | .10 | .09 | .09½ |
| West Coast, tks .... gal. | ... | .15 | ... | .15 | ... | .15 |
| Hydrogenated, naphthas, frt allowed East, tks .... gal. | ... | .16 | ... | .16 | .15 | .16 |
| No. 2, tks ..... gal. | ... | .18 | ... | .18 | ... | .18 |
| No. 3, tks ..... gal. | ... | .16 | ... | .16 | ... | .15 |
| No. 4, tks ..... gal. | ... | .18 | ... | .18 | ... | .18 |
| Lacquer diluents, tks Bayonne ..... gal. | .12 | .12½ | .12 | .12½ | .12 | .12½ |
| Group 3, tks ..... gal. | .08⅜ | .08½ | .08⅜ | .08½ | .07⅞ | .08½ |
| Naphtha, V.M.P., East, tks, wks ..... gal. | ... | .10½ | .10 | .10½ | .09 | .10 |
| Group 3, tks, wks ... gal. | .07⅜ | .07½ | .07⅜ | .07½ | .07⅜ | .07½ |
| Petroleum thinner, East, tks, wks ..... gal. | .09½ | .10 | .09 | .10 | .09 | .09½ |
| Group 3, tks, wks ... gal. | .06⅜ | .06⅝ | .06⅜ | .06⅝ | .06⅜ | .06⅝ |
| Rubber Solvents, stand grd, East, tks, wks ..... gal. | ... | .10 | .09½ | .10 | .09 | .09½ |
| Group 3, tks, wks ... gal. | .07⅜ | .07½ | .07⅜ | .07½ | .07⅜ | .07½ |
| Stoddard Solvent, East, tks, wks ..... gal. | ... | .10 | .09½ | .10 | .09 | .09½ |
| Group 3, tks, wks ... gal. | .06⅞ | .07 | .06⅞ | .07 | .06⅞ | .07 |
| Phenol, 250-100 lb drs .... lb. | .13¼ | .15 | .13¼ | .15 | .13¼ | .15 |
| tks, wks ..... lb. | ... | .12¾ | ... | .12¾ | ... | ... |
| Phenyl-Alpha-Naphthylamine, 100 lb kgs ..... lb. | ... | 1.35 | ... | 1.35 | ... | 1.35 |
| Phenyl Chloride, drs ..... lb. | ... | .17 | .16 | .17 | ... | .16 |
| Phenylhydrazine Hydrochloride, com ..... lb. | 2.30 | 6.50 | 2.30 | 6.50 | 2.90 | 3.00 |
| Phloroglucinol, tech, tins .. lb. | 15.00 | 16.50 | 15.00 | 16.50 | 15.00 | 16.50 |
| CP, tins ..... lb. | 20.00 | 22.00 | 20.00 | 22.00 | 20.00 | 22.00 |

| | | Current Market | 1937 Low | 1937 High | 1936 Low | 1936 High |
|---|---|---|---|---|---|---|
| Phosphate Rock, f.o.b. mines | | | | | | |
| Florida Pebble, 68% basis | ton | ... | 1.85 | ... | 1.85 | ... | 1.85 |
| 70% basis | ton | ... | 2.35 | ... | 2.35 | ... | 2.35 |
| 72% basis | ton | ... | 2.85 | ... | 2.85 | ... | 2.85 |
| 75-74% basis | ton | ... | 3.85 | ... | 3.85 | ... | 3.85 |
| 75% basis | ton | ... | 5.50 | ... | 5.50 | ... | 4.35 |
| Tennessee, 72% basis | ton | ... | 4.50 | ... | 4.50 | ... | 4.50 |
| Phosphorus Oxychloride 175 lb cyl | lb. | .16 | .20 | .16 | .20 | .16 | .20 |
| Red, 110 lb cases | lb. | .40 | .44 | .40 | .44 | .40 | .45 |
| Sesquisulfide, 100 lb cs. | lb. | .38 | .44 | .38 | .44 | .38 | .44 |
| Trichloride, cyl | lb. | .15 | .18 | .15 | .20 | .16 | .20 |
| Yellow, 110 lb cs, wks. | lb. | .24 | .30 | .24 | .33 | .28 | .33 |
| Phthalic Anhydride, 100 lb drs, wks | lb. | .14½ | nom. | .14½ | .15½ | .14½ | .15½ |
| Pine Oil, 55 gal drs or bbls | | | | | | | |
| Destructive dist | lb. | .49 | .50 | .49 | .50 | .44 | .50 |
| Steam dist wat wh bbls | gal. | .64 | .65 | .64 | .65 | .64 | .65 |
| tks | gal. | ... | .59 | ... | .59 | ... | .59 |
| Straw color, bbls | gal. | ... | .59 | ... | .59 | ... | .59 |
| tks | gal. | ... | .54 | ... | .54 | ... | .54 |
| Pitch Hardwood, wks | ton | 16.00 | 16.50 | 15.00 | 16.50 | ... | 15.00 |
| Coaltar, bbls, wks | ton | ... | 19.00 | ... | 19.00 | ... | 19.00 |
| Burgundy, dom, bbls, wks | lb. | ... | .03½ | ... | .03½ | ... | .03½ |
| Imported | lb. | .11 | .13 | .11 | .13 | .11 | .13 |
| Petroleum, see Asphaltum in Gums' Section. | | | | | | | |
| Pine, bbls | bbl. | 6.00 | 6.50 | 6.00 | 6.50 | 4.00 | 5.25 |
| Stearin, drs | lb. | .03 | .04½ | .03 | .04½ | .03 | .04½ |
| Platinum, ref'd | oz. | 56.00 | 66.00 | 45.00 | 68.00 | 34.50 | 64.00 |
| **POTASH** | | | | | | | |
| Potash, Caustic, wks, sol. | lb. | .06¼ | .06½ | .06¼ | .06½ | .06¼ | .06½ |
| flake | lb. | .07 | .07⅜ | .07 | .07⅜ | .07 | .07⅜ |
| Liquid, tks | lb. | ... | .02⅞ | ... | .02⅞ | ... | .02⅞ |
| Manure Salts, imported 20% basis, blk | ton | ... | 12.00 | ... | 12.00 | 11.00 | 12.00 |
| 30% basis, blk | unit | ... | .55 | ... | ... | ... | ... |
| Potassium Abietate, bbls | lb. | ... | .13 | ... | ... | ... | ... |
| Acetate | lb. | .26 | .28 | .26 | .28 | .26 | .28 |
| Bicarbonate, USP, 320 lb bbls | lb. | .09 | .18 | .09 | .18 | .09 | .18 |
| Bichromate Crystals, 725 lb cks* | lb. | .08½ | .09 | .08½ | .09 | .08½ | .09 |
| Binoxalate, 300 lb bbls. | lb. | ... | .23 | ... | .23 | ... | .23 |
| Bisulfate, 100 lb kgs | lb. | .15½ | .18 | .15½ | .18 | .15½ | .18 |
| Carbonate, 80-85% calc 800 lb cks | lb. | .06½ | .07 | .06½ | .07 | .06½ | .07½ |
| liquid, tks | lb. | ... | .02¾ | ... | .02¾ | .02¼ | .02⅞ |
| drs, wks | lb. | .02⅞ | .03½ | .02⅞ | .03½ | .02⅞ | .03¼ |
| Chlorate crys, 112 lb kgs, wks | lb. | .09¼ | .09½ | .09¼ | .09½ | .09¼ | .09½ |
| gran, kgs | lb. | .12 | .13 | .12 | .13 | .12 | .13 |
| powd, kgs | lb. | .08½ | .08¾ | .08½ | .08¾ | .08 | .08¼ |
| Chloride, crys, bbls | lb. | .04 | .04¾ | .04 | .04¾ | .04 | .04¾ |
| Chromate, kgs | lb. | .28 | .29 | .28 | .29 | .23 | .28 |
| Cyanide, 110 lb cases | lb. | .55 | .57½ | .55 | .57½ | .55 | .57½ |
| Iodide, 75 lb bbls | lb. | .93 | 1.00 | .93 | 1.15 | 1.10 | 1.25 |
| Metabisulfite, 300 lb bbls | lb. | .11 | .12 | .11 | .15 | .13¾ | .15 |
| Muriate, bgs, dom, blk | unit | ... | .50 | ... | .50 | .45 | .50 |
| Oxalate, bbls | lb. | .25 | .26 | .25 | .26 | .25 | .26 |
| Perchlorate, kgs, wks | lb. | .09 | .11 | .09 | .11 | .09 | .11 |
| Permanganate, USP, crys, 500 & 1000 lb drs, wks | lb. | .18½ | .19½ | .18½ | .19½ | .18½ | .19½ |
| Prussiate, red, bbls | lb. | .35 | .37 | .35 | .37 | .35 | .38½ |
| Yellow, bbls | lb. | .15 | .16 | .15 | .18 | .16 | .19 |
| Sulfate, 90% basis, bgs | ton | ... | 36.25 | ... | 36.25 | 33.75 | 36.25 |
| Titanium Oxalate, 200 lb bbls | lb. | .33 | .35 | .33 | .35 | .32 | .35 |
| Pot & Mag Sulfate, 48% basis bgs | ton | ... | 24.75 | ... | 24.75 | 22.25 | 24.75 |
| Propane, group 3, tks | lb. | .03 | .04⅜ | .03 | .04⅜ | .03 | .04⅜ |
| Putty, coml, tubs | 100 lb. | ... | 2.90 | 2.90 | 3.00 | 2.75 | 3.00 |
| Linseed Oil, kgs | 100 lb. | ... | 4.65 | 4.65 | 4.75 | 4.50 | 4.75 |
| Pyrethrum, conc liq: 2.4% pyretherins, drs, frt allowed | gal. | ... | 4.15 | ... | 4.15 | ... | ... |
| 3.6% pyretherins, drs, frt allowed | gal. | ... | 6.10 | ... | 6.10 | ... | ... |
| Flowers, coarse, Japan, bgs | lb. | ... | .12¾ | ... | .12¾ | ... | ... |
| Fine powd, bbls | lb. | .14 | .16 | .14 | .16 | ... | ... |
| Pyridine, denat, 50 gal drs | gal. | ... | 1.30 | ... | 1.30 | ... | 1.30 |
| Pyrites, Spanish cif Atlantic ports, blk | unit | .12 | .13 | .12 | .13 | .12 | .13 |
| Pyrocatechin, CP, drs, tins | lb. | 2.15 | 2.75 | 2.15 | 2.75 | 2.15 | 2.75 |
| Quebracho, 35% liq tks | lb. | ... | .02⅞ | ... | .02⅞ | .02⅝ | .02⅞ |
| 450 lb bbls, c-l | lb. | ... | .03¾ | ... | .03¾ | .03⅞ | .03¾ |
| Solid, 63%, 100 lb bales cif | lb. | ... | .03⅞ | ... | .03⅞ | .03⅝ | .03⅞ |
| Clarified, 64%, bales | lb. | ... | .04⅜ | ... | .04⅜ | .03⅞ | .04⅜ |
| Quercitron, 51 deg liq, 450 lb bbls | lb. | .06 | .06½ | .06 | .06½ | .06 | .06½ |
| Solid, drs | lb. | .10 | .12 | .10 | .12 | .10 | .12 |
| **R SALT** | | | | | | | |
| R Salt, 250 lb bbls, wks | lb. | .52 | .55 | .52 | .55 | .52 | .57 |
| Resorcinol tech, cans | lb. | .75 | .80 | .75 | .80 | .75 | .80 |
| Rochelle Salt, cryst | lb. | .14½ | .15 | .14½ | .15 | .14 | .15 |
| Powd, bbls | lb. | .13½ | .14 | .13½ | .14 | .13 | .14 |
| Rosin Oil, bbls, first run | gal. | .66 | .68 | .66 | .73 | .38 | .71 |
| Second run | gal. | .68 | .70 | .68 | .75 | .43 | .73 |
| Third run, drs | gal. | .72 | .74 | .72 | .79 | .49 | .77 |

* Spot price is ⅛c higher.


# HENRY BOWER CHEMICAL MFG. CO.

*manufacturers of:—*

Yellow Prussiate of Soda
Anhydrous Ammonia
Aqua Ammonia

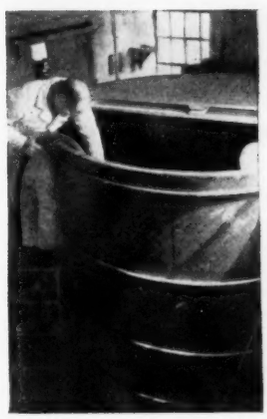
*distributors of:—*

Calcium Chloride
Tri-sodium Phosphate

*Established 1858*

**HENRY BOWER CHEMICAL MFG. CO.**
**2815 Gray's Ferry Road, Philadelphia, Pa.**

# FOOTE LITHIUM



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**551 Fifth Avenue, New York**



# Prices

| | | Current Market | 1937 Low | 1937 High | 1936 Low | 1936 High |
|---|---|---|---|---|---|---|
| Rosins 600 lb bbls, 280 lb unit ex. yard NY: | | | | | | |
| B | ... | 8.75 | 8.75 | 10.00 | 4.45 | 10.95 |
| D | ... | 9.30 | 9.30 | 10.35 | 4.95 | 10.95 |
| E | ... | 9.00 | 9.00 | 10.25 | 5.15 | 10.95 |
| F | ... | 10.00 | 10.00 | 10.80 | 5.40 | 10.95 |
| G | ... | 10.00 | 10.00 | 10.85 | 5.50 | 10.95 |
| H | ... | 10.00 | 10.00 | 10.85 | 5.60 | 10.95 |
| I | ... | 10.00 | 10.00 | 10.90 | 5.70 | 10.95 |
| K | ... | 10.00 | 10.00 | 10.90 | 5.55 | 10.95 |
| M | ... | 10.00 | 10.00 | 11.00 | 5.60 | 10.95 |
| N | ... | 10.05 | 10.05 | 11.05 | 5.70 | 11.00 |
| WG | ... | 10.05 | 10.05 | 11.75 | 5.85 | 11.00 |
| WW | ... | 11.00 | 11.00 | 13.75 | 5.90 | 12.05 |
| Rosins, Gum, Savannah (280 lb unit): | | | | | | |
| B | ... | 7.50 | 7.50 | 8.75 | 3.15 | 9.70 |
| D | ... | 7.75 | 7.75 | 9.00 | 3.75 | 9.70 |
| E | ... | 8.05 | 8.05 | 9.10 | 3.90 | 9.70 |
| F | ... | 8.75 | 8.75 | 9.55 | 4.10 | 9.70 |
| G | ... | 8.75 | 8.75 | 9.60 | 4.20 | 9.70 |
| H | ... | 8.75 | 8.75 | 9.60 | 4.30 | 9.70 |
| I | ... | 8.75 | 8.75 | 9.65 | 4.35 | 9.70 |
| K | ... | 8.75 | 8.75 | 9.65 | 4.30 | 9.70 |
| M | ... | 8.75 | 8.75 | 9.75 | 4.35 | 9.70 |
| N | ... | 8.80 | 8.80 | 9.75 | 4.45 | 9.75 |
| WG | ... | 8.80 | 8.80 | 10.50 | 4.45 | 9.75 |
| WW | ... | 9.75 | 9.75 | 12.50 | 4.55 | 10.80 |
| X | ... | 9.75 | 9.75 | 12.50 | 4.55 | 10.80 |
| Rosins, Wood, wks (280 lb unit), wks, FF | ... | 9.85 | ... | 9.85 | 4.30 | 9.80 |
| Rosin, Wood, c-l, FF grade, NY | ... | 9.76 | 9.76 | 10.72 | 6.10 | 10.52 |
| Rotten Stone, bgs mines..ton | ... | 35.00 | ... | 35.00 | ... | 35.00 |
| Imported, lump, bbls ...lb. | ... | .12 | ... | ... | ... | ... |
| Powdered, bbls .....lb. | .08½ | .10 | ... | ... | ... | ... |
| **SAGO FLOUR** | | | | | | |
| Sago Flour, 150 lb bgs ...lb. | .02¾ | .03¼ | .02¾ | .03¼ | .02¾ | .03¼ |
| Sal Soda, bbls, wks ...100 lb. | ... | 1.15 | ... | 1.15 | 1.15 | 1.30 |
| Salt Cake, 94-96%, c-l, wks ton | 19.00 | 23.00 | 19.00 | 23.00 | 19.00 | 23.00 |
| Chrome, c-l, wks .....ton | 11.00 | 12.00 | 11.00 | 12.00 | 11.00 | 13.00 |
| Saltpetre, gran, 450-500 lb bbls .....lb. | .06 | .064 | .06 | .064 | .059 | .06¼ |
| Cryst, bbls .....lb. | .07 | .074 | .07 | .074 | .069 | .08 |
| Powd, bbls .....lb. | .07 | .074 | .07 | .074 | .069 | .07⅞ |
| Satin, White, 550 lb bbls..lb. | ... | .01½ | ... | .01½ | ... | .01½ |
| Schaeffer's Salt, kgs .....lb. | .46 | .48 | .46 | .48 | .46 | .50 |
| Shellac, Bone dry, bbls..lb. *r* | .21 | .22 | .21 | .22 | .17½ | .26½ |
| Garnet, bgs .....lb. | .16 | .17 | .16 | .17 | .16 | .20 |
| Superfine, bgs .....lb. *s* | .15 | .18½ | .15 | .18½ | .14½ | .18½ |
| T. N., bgs .....lb. *s* | .14 | .14½ | .14 | .14½ | .13½ | .16 |
| Silver Nitrate, vials .....oz. | .33⅛ | .35½ | .32⅝ | .35½ | .32⅝ | .34⅞ |
| Slate Flour, bgs, wks ....ton | 9.00 | 10.00 | 9.00 | 10.00 | 9.00 | 10.00 |
| Soda Ash, 58% dense, bgs, c-l, wks .....100 lb. | ... | 1.25 | ... | 1.25 | ... | 1.25 |
| 58% light, bgs .....100 lb. | ... | 1.23 | ... | 1.23 | ... | 1.23 |
| blk .....100 lb. | ... | 1.05 | ... | 1.05 | ... | 1.05 |
| paper bgs .....100 lb. | ... | 1.20 | ... | 1.20 | ... | 1.20 |
| bbls .....100 lb. | ... | 1.50 | ... | 1.50 | ... | 1.50 |
| Caustic, 76% grnd & flake, drs .....100 lb. | ... | 3.00 | ... | 3.00 | ... | 3.00 |
| 76% solid, drs .....100 lb. | ... | 2.60 | ... | 2.60 | ... | 2.60 |
| Liquid sellers, tks ..100 lb. | ... | 2.25 | ... | 2.25 | ... | 2.25 |
| Sodium Abietate, drs .....lb. | ... | .13 | .08 | .13 | ... | .08 |
| Acetate, tech, 450 lb bbls, wks .....lb. | .04¼ | .05 | .04¼ | .05 | .04½ | .05 |
| Alignate, drs .....lb. | ... | .69 | .64 | .69 | ... | .64 |
| Antimoniate, bbls .....lb. | .15¾ | .16¼ | .13¾ | .16¼ | .12 | .14 |
| Arsenate, drs .....lb. | .08 | .10 | .08 | .11½ | ... | .10½ |
| Arsenite, liq, drs .....gal. | .30 | .33 | .33 | .40 | .40 | .75 |
| Benzoate, USP, kgs .....lb. | .46 | .48 | .46 | .48 | .46 | .48 |
| Bicarb, 400 lb bbl, wks 100 lb. | ... | 1.75 | ... | 1.75 | 1.75 | 1.85 |
| Bichromate, 500 lb cks, wks* .....lb. | .06½ | .07 | .06½ | .07 | .06½ | .07 |
| Bisulfite, 500 lb bbl, wks lb. | .03¼ | .036 | .03¼ | .036 | .03¼ | .036 |
| 35-40% sol bbls, wks 100 lb. | 1.40 | 1.80 | ... | ... | ... | ... |
| Chlorate, bgs, wks .....lb. | .06¼ | .07½ | .06¼ | .07½ | .06¼ | .07½ |
| Cyanide, 96-98%, 100 & 250 lb drs, wks .....lb. | .16½ | .17½ | .15½ | .17½ | .15½ | .17½ |
| Fluoride, 90%, 300 lb bbls, wks .....lb. | .07½ | .08¼ | .07½ | .08¼ | .07¼ | .08¼ |
| Hydrosulfite, 200 lb bbls, f.o.b. wks .....lb. | .16 | .17 | .16 | .17 | .17 | .19 |
| Hyposulfite, tech, pea crys 375 lb bbls, wks 100 lb. | 2.50 | 3.00 | 2.50 | 3.00 | 2.50 | 3.00 |
| Tech, reg cryst, 375 lb bbls, wks .....100 lb. | 2.40 | 2.75 | 2.40 | 2.75 | 2.40 | 2.75 |
| Iodide .....lb. | 1.90 | 1.95 | 1.90 | 1.95 | 1.90 | 2.05 |
| Metal, drs, 280 lbs .....lb. | ... | .19 | ... | .19 | ... | ... |
| Metanilate, 150 lb bbls..lb. | .41 | .42 | .41 | .42 | .41 | .42 |
| Metasilicate, gran, c-l, wks .....100 lb. | ... | 2.15 | ... | 2.15 | 2.15 | 3.00 |
| cryst, bbls, c-l, wks 100 lb. | ... | 2.75 | ... | 2.75 | 2.75 | 3.25 |
| Monohydrate, bbls .....lb. | ... | .023 | ... | .023 | ... | .023 |
| Naphthenate, drs .....lb. | ... | .12 | .09 | .12 | ... | .09 |
| Naphthionate, 300 lb bbl lb. | .52 | .54 | .52 | .54 | .52 | .54 |
| Nitrate, 92%, crude, 200 lb bgs, c-l, NY .....ton | ... | 26.80 | ... | 26.80 | 24.80 | 26.80 |
| 100 lb bgs .....ton | ... | 27.50 | ... | 27.50 | 25.50 | 27.50 |
| Bulk .....ton | ... | 25.50 | ... | 25.50 | 23.50 | 25.50 |

*r* Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 3c; Philadelphia deliveries f.o.b. N. Y.; refined 6c higher in each case; *s* T. N. and Superfine prices quoted f.o.b. N. Y. and Boston; Chicago prices 1c higher: Pacific Coast 3c; Philadelphia f.o.b. N. Y. * Spot price is ⅛c higher.

## Current

**Sodium Nitrite**
**Terpineol**

| | Current Market | 1937 Low | 1937 High | 1936 Low | 1936 High |
|---|---|---|---|---|---|
| Sodium (continued): | | | | | |
| Nitrite, 500 lb bbls ..... lb. | .07 | .07 | .10 | .07 | .08 |
| Orthochlorotoluene, sulfonate, 175 lb bbls, wks .. lb. | .25 | .25 | .27 | .25 | .27 |
| Perborate, drs, 400 lbs .. lb. | .14¾ | .14¾ | .15¼ | .14¾ | .18 |
| Peroxide, bbls, 400 lb ... lb. | ... | ... | .17 | ... | .17 |
| Phosphate, di-sodium, tech, 310 lb bbls, wks 100 lb. | ... | 1.90 | 1.90 | 1.95 | 2.30 |
| bgs, wks ..... 100 lb. | ... | 1.70 | 1.70 | 1.75 | 2.10 |
| Tri-sodium, tech, 325 lb bbls, wks ..... 100 lb. | ... | 2.05 | 2.05 | 1.95 | 2.30 |
| bgs, wks ..... 100 lb. | ... | 1.85 | 1.85 | 1.75 | 2.10 |
| Picramate, 160 lb kgs ... lb. | .65 | .67 | .65 | .67 | .65 | .69 |
| Prussiate, Yellow, 350 lb bbl, wks ..... lb. | .10 | .11½ | .10 | .11½ | .10 | .12 |
| Pyrophosphate, anhyd, 100 lb bbls ..... lb. | ... | .10 | ... | .10 | .10 | .132 |
| Silicate, 60°, 55 gal drs, wks ..... 100 lb. | 1.65 | 1.70 | 1.65 | 1.70 | 1.65 | 1.70 |
| 40°, 35 gal drs, wks 100 lb. | ... | .80 | ... | .80 | ... | .80 |
| tks, wks ..... 100 lb. | ... | .65 | ... | .65 | ... | .65 |
| Silicofluoride, 450 lb bbls NY ..... lb. | .06½ | .07 | .06½ | .07 | .05¼ | .07¼ |
| Stannate, 100 lb drs .... lb. | .41 | .44 | .33 | .44 | .28½ | .37½ |
| Stearate, bbls ..... lb. | ... | .19 | .19 | .20 | .20 | .26 |
| Sulfanilate, 400 lb bbls .. lb. | .16 | .18 | .16 | .18 | .16 | .18 |
| Sulfate Anhyd, 550 lb bgs* c-l, wks ..... 100 lb. ‡ | 1.45 | 1.90 | 1.45 | 1.90 | 1.30 | 1.90 |
| Sulfide, 80% cryst, 440 lb bbls, wks ..... lb. | ... | .02¼ | ... | .02¼ | ... | .02¼ |
| 62% solid, 650 lb drs, c-l, wks ..... lb. | ... | .02 | ... | .02 | ... | .03 |
| Sulfite, cryst, 400 lb bbls, wks ..... lb. | .023 | .02½ | .023 | .02½ | .023 | .02½ |
| Sulfocyanide, drs ..... lb. | .28 | .47 | .28 | .47 | .28 | .47 |
| Sulforicinoleate, bbls ... lb. | ... | .12 | ... | .12 | ... | ... |
| Tungstate, tech, crys, kgs lb. | .80 | .85 | .85 | .90 | .85 | .90 |
| Sorbitol, com., drs, basis content, wks ..... lb. | ... | .25 | ... | .25 | ... | ... |
| Spruce Extract, ord, tks ... lb. | ... | .01 | ... | .01 | ... | .01 |
| Ordinary, bbls ..... lb. | ... | .01½ | ... | .01½ | ... | .01½ |
| Super spruce ext, tks ... lb. | ... | .01⅝ | ... | .01⅝ | ... | .01⅜ |
| Super spruce ext, bbls .. lb. | ... | .01⅞ | ... | .01⅞ | ... | .01⅞ |
| Super spruce ext, powd, bgs ..... lb. | ... | .04 | ... | .04 | ... | .04 |
| Starch, Pearl, 140 lb bgs 100 lb. | 3.88 | 4.08 | 3.78 | 4.08 | 2.99 | 4.30 |
| Powd, 140 lb bgs ... 100 lb. | 3.98 | 4.18 | 3.88 | 4.18 | 3.90 | 4.54 |
| Potato, 200 lb bgs ..... lb. | .04½ | .05½ | .04½ | .05½ | .04½ | .05½ |
| Imp, bgs ..... lb. | .05 | .06 | .05 | .06 | .05 | .06 |
| Rice, 200 lb bbls ..... lb. | ... | .07¼ | ... | .07¼ | ... | .07¼ |
| Wheat, thick, bgs ..... lb. | .08¼ | .08½ | .08¼ | .08½ | .08¼ | .08½ |
| Strontium carbonate, 600 lb bbls, wks ..... lb. | .07¼ | .07½ | .07¼ | .07½ | .07¼ | .07½ |
| Nitrate, 600 lb bbls, NY lb. | .07¾ | .08¾ | .07¾ | .08¾ | .08¾ | .09½ |
| Sucrose octa-acetate, den, grd, bbls, wks ..... lb. | .45 | ... | .45 | ... | .45 | ... |
| tech, bbls, wks ..... lb. | .40 | ... | .40 | ... | .40 | ... |
| Sulfur ..... | ... | ... | ... | ... | ... | ... |
| Crude, f.o.b. mines .... ton | 18.00 | 19.00 | 18.00 | 19.00 | 18.00 | 19.00 |
| Flour, coml, bgs .... 100 lb. | 1.65 | 2.35 | 1.65 | 2.35 | 1.60 | 2.35 |
| bbls ..... 100 lb. | 1.95 | 2.70 | 1.95 | 2.70 | 1.95 | 2.70 |
| Rubbermakers, bgs .. 100 lb. | 2.20 | 2.80 | 2.20 | 2.80 | 2.20 | 2.80 |
| bbls ..... 100 lb. | 2.55 | 3.15 | 2.55 | 3.15 | 2.55 | 3.15 |
| Extra fine, bgs ..... 100 lb. | 2.85 | 3.00 | 2.85 | 3.00 | 2.40 | 3.00 |
| Superfine, bgs ..... 100 lb. | 2.65 | 2.80 | 2.65 | 2.80 | 2.20 | 2.80 |
| bbls ..... 100 lb. | 2.25 | 3.10 | 2.25 | 3.10 | 2.25 | 3.10 |
| Flowers, bgs ..... 100 lb. | 3.00 | 3.75 | 3.00 | 3.75 | 3.00 | 3.75 |
| bbls ..... 100 lb. | 3.35 | 4.10 | 3.35 | 4.10 | 3.35 | 4.10 |
| Roll, bgs ..... 100 lb. | 2.35 | 3.10 | 2.35 | 3.10 | 2.35 | 3.10 |
| bbls ..... 100 lb. | 2.50 | 3.25 | 2.50 | 3.25 | 2.50 | 3.25 |
| Sulfur Chloride, 700 lb drs, wks ..... lb. | .02½ | .03½ | ... | ... | ... | ... |
| Sulfur Dioxide, 150 lb cyl lb. | .07 | .09 | .07 | .09 | .06½ | .08½ |
| Multiple units, wks .... lb. | .04½ | .07 | .04½ | .07 | .05½ | .06 |
| tks, wks ..... lb. | .04 | .05 | .04 | .05 | .04½ | .04¾ |
| Refrigeration, cyl, wks .. lb. | .15 | .17 | .15 | .17 | .10 | .13 |
| Multiple units, wks .... lb. | .07½ | .10 | .07½ | .10 | .07 | .09¼ |
| Sulfuryl Chloride ..... lb. | .15 | .40 | .15 | .40 | .15 | .40 |
| Sumac, Italian, grd ..... ton | 60.00 | 65.00 | 60.00 | 65.00 | 52.00 | 60.00 |
| Extract, 42°, bbls ..... lb. | ... | .05¼ | ... | .05¼ | ... | ... |
| Superphosphate, 16% bulk, wks ..... ton | 8.25 | 8.32½ | 8.25 | 8.32½ | ... | ... |
| Run of pile ..... ton | ... | 8.00 | ... | 8.00 | ... | ... |
| Triple, 44-45%, a. p. a. bulk, wks, Balt. unit ..... ton | ... | .70 | ... | .70 | ... | ... |
| Talc, Crude, 100 lb bgs, NY ton | 13.00 | 15.00 | 13.00 | 15.00 | 13.00 | 15.00 |
| Ref'd, 100 lb bgs, NY ton | 14.00 | 16.00 | 14.00 | 16.00 | 14.00 | 18.00 |
| French, 220 lb bgs, NY ton | 23.00 | 30.00 | 23.00 | 30.00 | 22.00 | 30.00 |
| Ref'd, white, bgs, NY ton | 45.00 | 60.00 | 45.00 | 60.00 | 45.00 | 60.00 |
| Italian, 220 lb bgs to arr ton | 60.00 | 62.00 | 60.00 | 62.00 | 60.00 | 75.00 |
| Ref'd, white, bgs, NY ton | 65.00 | 70.00 | 65.00 | 70.00 | 65.00 | 80.00 |
| Tankage Grd, NY ..... unit u | ... | 4.00 | 4.00 | 4.40 | 2.65 | 4.25 |
| Ungrd ..... unit u | ... | 4.00 | 3.90 | 4.35 | 2.40 | 4.25 |
| Fert grade, f.o.b. Chicago ..... unit u | ... | 3.75 | 3.75 | 4.00 | 2.40 | 4.00 |
| South American cif .. unit u | ... | 4.00 | 4.00 | 4.25 | 2.70 | 3.90 |
| Tapioca Flour, high grade, bgs ..... lb. | .03½ | .05½ | .03½ | .05½ | .03½ | .05½ |
| Tar Acid Oil, 15%, drs .. gal. | .21 | .24 | .21 | .24 | .21 | .24 |
| 25%, drs ..... gal. | .24½ | .27½ | .24½ | .27½ | .24 | .27½ |
| Tar, pine, delv, drs ..... gal. | ... | .26 | ... | .26 | .25 | .26 |
| tks, delv, E. cities .... gal. | ... | .20 | ... | .20 | ... | .20 |
| Tartar Emetic, tech, bbls .. lb. | .26¾ | .27 | .24¾ | .27 | .24¾ | .25 |
| USP, bbls ..... lb. | .30 | .30½ | .30 | .30½ | .28 | .30½ |
| Terpineol, den grd, drs ... lb. | .13¾ | .14¾ | .13¾ | .14¾ | .13¾ | .14¾ |
| tks ..... lb. | .13 | .14 | .13 | .14 | .13 | .14 |

‡ Bags 15c lower; u + 10; * Bbls. are 20c higher.


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Iso Propyl Ether
Methallyl Alcohol
Methallyl Chloride
Methyl Ethyl Ketone
Methyl Propyl Ketone
Tri Isobutylene

Manufactured by

SHELL CHEMICAL COMPANY

San Francisco

**Tetrachlorethane**
**Zinc Stearate**

## Prices

| | Current Market | | 1937 Low | 1937 High | 1936 Low | 1936 High |
|---|---|---|---|---|---|---|
| Tetrachlorethane, 650 lb drs | lb. | .08 | .08½ | .08 | .08½ | .08 | .08½ |
| Tetrachloroethylene, drs, tech | lb. | ... | .10½ | ... | .10½ | ... | ... |
| Tetralene, 50 gal drs, wks | lb. | .12 | .13 | .12 | .13 | .12 | .13 |
| Thiocarbanilid, 170 lb bbl | lb. | .20 | .25 | .20 | .25 | .20 | .25 |
| Tin, crystals, 500 lb bbls, wks | lb. | .45½ | .46 | .37½ | .46 | .35 | .39½ |
| Metal, NY | lb. | ... | .66 | .49⅞ | .66 | .40½ | .52½ |
| Oxide, 300 lb bbls, wks | lb. | .63 | .66 | .55 | .59 | .47 | .57 |
| Tetrachloride, 100 lb drs, wks | lb. | ... | .32 | .25½ | .32 | .21¼ | .26¾ |
| Titanium Dioxide, 300 lb bbls | lb. | .16¼ | .17 | .16¼ | .17 | .16¼ | .19¼ |
| Barium Pigment, bbls | lb. | .06 | .06¼ | .06 | .06¼ | .05¾ | .06½ |
| Calcium Pigment, bbls | lb. | .06 | .06¼ | .06 | .06¼ | .05¾ | .06½ |
| Toluidine, mixed, 900 lb drs, wks | lb. | .26 | .27 | .26 | .27 | .27 | .28 |
| Toluol, 110 gal drs, wks | gal. | ... | .35 | ... | .35 | ... | .35 |
| 8000 gal tks, frt allowed | gal. | ... | .30 | ... | .30 | ... | .30 |
| Toner Lithol, red, bbls | lb. | .75 | .80 | .75 | .80 | .75 | .80 |
| Para, red, bbls | lb. | ... | .75 | ... | .75 | ... | .75 |
| Toluidine, bgs | lb. | ... | 1.35 | ... | 1.35 | ... | 1.35 |
| Triacetin, 50 gal drs, wks | lb. | ... | .36 | ... | .36 | .32 | .36 |
| Triamyl Borate, lcl, drs, wks | lb. | ... | .27 | ... | .27 | ... | ... |
| Triamylamine, c-l, drs, wks | lb. | .77 | 1.25 | .77 | 1.25 | ... | 1.25 |
| Tributyl citrate, drs, frt all'd | lb. | ... | .45 | ... | .45 | ... | ... |
| Tributyl Phosphate, frt all'd | lb. | ... | .50 | ... | .50 | ... | ... |
| Trichlorethylene, 600 lb drs, frt allowed E. Rocky Mts | lb. | .089 | .094 | .089 | .094 | .089 | .094 |
| Tricresyl phosphate, tech, drs | lb. | .24½ | .25 | .22½ | .25 | .19 | .26 |
| Triethanolamine, 50 gal drs wks | lb. | .26 | .30 | .26 | .30 | .26 | .30 |
| tks, wks | lb. | ... | .25 | ... | .25 | ... | .25 |
| Triethylene glycol, drs, wks | lb. | ... | .26 | ... | ... | ... | ... |
| Trihydroxyethylamine Oleate, bbls | lb. | ... | .30 | ... | ... | ... | ... |
| Stearate, bbls | lb. | ... | .30 | ... | ... | ... | ... |
| Trimethylamine, c-l, drs, frt allowed E. Mississippi | lb. | ... | 1.00 | ... | 1.00 | ... | ... |
| Triphenylguanidine | lb. | .58 | .60 | .58 | .60 | .58 | .60 |
| Triphenyl Phosphate, drs | lb. | .34 | .36 | ... | ... | ... | ... |
| Tripoli, airfloated, bgs, wks | ton | 25.00 | 30.00 | 25.00 | 30.00 | 27.50 | 30.00 |
| Turpentine (Spirits), c-l, NY dock, bbls | gal. | ... | .47 | ... | .47 | .40½ | .50 |
| Savannah, bbls | gal. | ... | .42 | ... | .42 | .35½ | .45 |
| Jacksonville, bbls | gal. | ... | .39½ | .39½ | .41 | .35¼ | .44½ |
| Wood Steam dist, bbls, c-l, NY | gal. | ... | .39 | .39 | .44 | .38 | .47 |
| Urea, pure, 112 lb cases | lb. | .14½ | .15½ | .14½ | .15½ | .14½ | .17 |
| Fert grade, bgs, c.i.f. | ton | | | | | | |
| c.i.f. S.A. points | ton | 95.00 | 110.00 | 95.00 | 110.00 | 95.00 | 110.00 |
| Dom, f.o.b., wks | ton | 95.00 | 101.00 | 95.00 | 101.00 | 95.00 | 110.00 |
| Urea Ammonia liq 55% $NH_3$, tks | unit | ... | 1.04 | ... | 1.04 | ... | .96 |
| Valonia beard, 42%, tannin bgs | ton | ... | 48.50 | 35.00 | 49.00 | 46.00 | 64.50 |
| Cups, 32% tannin, bgs | ton | 32.50 | 34.50 | 31.50 | 36.00 | 34.00 | 42.00 |
| Vanilin, ex eugenol, 25 lb tins, 2000 lb lots | lb. | ... | 3.65 | ... | 3.65 | 3.65 | 3.75 |
| Ex-guaiacol | lb. | ... | 3.55 | ... | 3.55 | 3.55 | 3.65 |
| Vermillion, English, kgs | lb. | 1.72 | 1.82 | 1.72 | 1.82 | 1.52 | 1.85 |
| Wattle Bark, bgs | ton | 33.50 | 34.50 | 31.00 | 32.00 | 26.50 | 32.00 |
| Extract, 60°, tks, bbls | lb. | ... | .03⅝ | ... | .03⅝ | ... | .03⅝ |
| **WAXES** | | | | | | | |
| Wax, Bayberry, bgs | lb. | .16½ | .17 | .16½ | .17 | .16½ | .20 |
| Bees, bleached, white 500 lb slabs, cases | lb. | .38 | .44 | .38 | .42 | .34 | .40 |
| Yellow, African, bgs | lb. | .29½ | .30 | .28½ | .30 | .24 | .27 |
| Brazilian, bgs | lb. | .31 | .32½ | .33 | .33½ | .25 | .29½ |
| Chilean, bgs | lb. | .31 | .32½ | .30 | .33½ | .25 | .29½ |
| Refined, 500 lb slabs, cases | lb. | .34 | .38 | .29½ | .38 | .28 | .32 |
| Candelilla, bgs | lb. | .15½ | .16½ | .15½ | .16½ | .14 | .17½ |
| Carnauba, No. 1, yellow, bgs | lb. | .45½ | .47 | .45 | .47 | .43½ | .48 |
| No. 2, yellow, bgs | lb. | .44 | .44½ | .43½ | .45 | .42 | .46 |
| No. 2, N. C., bgs | lb. | .40 | .41 | .38 | .41 | .38 | .40 |
| No. 3, Chalky, bgs | lb. | .35 | .36½ | .34½ | .36½ | .33½ | .38 |
| No. 3, N. C., bgs | lb. | .36¼ | .39¾ | .35 | .37¾ | .34 | .41 |
| Ceresin, dom, bgs | lb. | .08½ | .12 | .08 | .12 | .08 | .11 |
| Japan, 224 lb cases | lb. | .10¼ | .10½ | .10¼ | .11 | .08 | .10½ |
| Montan, crude, bgs | lb. | .11 | .12 | .11 | .12 | .10¾ | .11¾ |
| Paraffin, see Paraffin Wax. | | | | | | | |
| Spermaceti, blocks, cases | lb. | .23 | .24 | .23 | .24 | .22 | .24 |
| Cakes, cases | lb. | .24 | .25 | .24 | .25 | .23 | .25 |
| Whiting, chalk, com, 200 lb bgs c-l, wks | ton | 12.00 | 14.00 | 12.00 | 14.00 | ... | 15.00 |
| Gilders, bgs, c-l, wks | ton | ... | 15.00 | ... | 15.00 | 11.50 | 15.00 |
| Wood Flour, c-l, bgs | ton | 20.00 | 30.00 | 18.00 | 30.00 | 18.00 | 30.00 |
| Xylol, frt allowed, East 10° tks, wks | gal. | ... | .33 | ... | .33 | ... | .33 |
| Coml, tks, wks, frt all'd | gal. | ... | .30 | ... | .30 | ... | .30 |
| Xylidine, mixed crude, drs | lb. | .35 | .36 | .35 | .36 | .36 | .37 |
| Zinc, Carbonate tech, bbls, NY | lb. | .14 | .15 | .12 | .15 | .09 | .11 |
| Chloride fused, 600 lb drs, wks | lb. | .04½ | .046 | .04½ | .046 | .04½ | .05¾ |
| Gran, 500 lb drs, wks | lb. | .05 | .05¾ | .05 | .05¾ | .05 | .05¾ |
| Soln 50%, tks, wks 100 | lb. | ... | 2.00 | ... | 2.00 | ... | 2.00 |
| Cyanide, 100 lb drs | lb. | .36 | .38 | .36 | .38 | .36 | .38 |
| Zinc Dust, 500 lb bbls, c-l, delv | lb. | ... | .094 | .079 | .094 | .068 | .0755 |
| Metal, high grade slabs, c-l, NY | 100 lb. | ... | 7.85 | 6.35 | 7.85 | ... | 5.825 |
| E. St. Louis | 100 lb. | ... | 7.50 | 6.00 | 7.50 | 4.80 | 5.45 |
| Oxide, Amer, bgs, wks | lb. | .06¼ | .06½ | .05¼ | .06½ | .05 | .05½ |
| French, 300 lb bbls, wks | lb. | .06¼ | .06½ | .05½ | .07 | .05½ | .07 |
| Palmitate, bbls | lb. | .23 | .25 | .23 | .25 | .22 | .23 |
| Resinate, fused, pale, bbls | lb. | ... | .10 | .09 | .10 | .05¾ | .10 |
| Stearate, 50 lb bbls | lb. | .20 | .23 | .20 | .23 | .19 | .23 |

| | Current Market | | 1937 Low | 1937 High | 1936 Low | 1936 High |
|---|---|---|---|---|---|---|
| Zinc Sulfate, crys, 400 lb bbl, wks lb. | ... | .033 | .028 | .033 | .028 | .033 |
| Flake, bbls lb. | ... | .0375 | .032 | .0375 | .032 | .035 |
| Sulfide, 500 lb bbls, delv lb. | .09¼ | .09¾ | .09¼ | .09¾ | .09¼ | .11¾ |
| bgs, delv lb. | .09 | .09½ | .09 | .09½ | .09 | .11½ |
| Sulfocarbolate, 100 lb kgs lb. | .24 | .25 | .24 | .25 | .24 | .25 |
| Zirconium Oxide, crude, 73-75% grd, bbls, wks ton | 75.00 | 100.00 | ... | ... | ... | ... |
| kgs, wks lb. | .04¼ | .04½ | ... | ... | ... | ... |

### *Oils and Fats*

| | | | | | | |
|---|---|---|---|---|---|---|
| Babassu, tks, futures lb. | ... | .11¼ | ... | .11¼ | ... | ... |
| Castor, No. 3, 400 lb bbls. lb. | .10¼ | .10¾ | .10¼ | .10¾ | .10¼ | .10¾ |
| Blown, 400 lb bbls lb. | .12¾ | .13 | .12¼ | .13 | .12¼ | .13 |
| China Wood, drs, spot NY lb. | .15¼ | .15¼ | .14½ | .15½ | .13 | .19¼ |
| Tks, spot NY lb. | .147 | .148 | .14¼ | .148 | .125 | .19 |
| Coast, tks lb. | ... | nom. | .133 | .146 | .127 | .18 |
| Coconut, edible, bbls NY lb. | .14 | .14¾ | .14½ | .15 | .09¼ | .14¼ |
| Manila, tks, NY lb. | ... | .08½ | .08½ | .09½ | .04⅛ | .07 |
| Tks, Pacific Coast lb. | .08⅛ | .08¼ | .08⅛ | .08⅞ | .03⅞ | .08½ |
| Cod, Newfoundland, 50 gal bbls gal. | .51 | nom. | .51 | .52 | .40 | .48½ |
| Copra, bgs, NY lb. | .051 | nom. | .051 | .055 | .0320 | .0535 |
| Corn, crude, tks, mills lb. | .10⅛ | .10¼ | .10 | .10¾ | .08 | .10½ |
| Refd, 375 lb bbls, NY lb. | .12¾ | .13¼ | .12¾ | .13¼ | .10¾ | .13 |
| Cottonseed, see Oils and Fats News Section. | | | | | | |
| Degras, American, 50 gal bbls. NY lb. | .07¾ | .08 | .07¾ | .08 | .05¼ | .08 |
| English, bbls, NY lb. | .07¾ | .08 | .07¾ | .08 | .04 | .08 |
| Greases, Yellow lb. | .08⅞ | .09 | .08½ | .09 | .03⅜ | .08¼ |
| White, choice bbls, NY lb. | .09¼ | .10¼ | .08⅞ | .10¼ | .04⅛ | .08¾ |
| Herring, Coast, tks gal. | ... | nom. | ... | nom. | ... | .31 |
| Lard Oil, edible, prime lb. | ... | .16¼ | .16¼ | .16¾ | .12¾ | .16¼ |
| Extra, bbls lb. | ... | .13½ | ... | .13½ | .09½ | .13 |
| Extra, No. 1, bbls lb. | ... | .13½ | .13 | .13½ | .07¾ | .12¼ |
| Linseed, Raw less than 5 bbl lots lb. | ... | .115 | .107 | .115 | .104 | .117 |
| bbls, c-l, spot lb. | ... | .107 | .099 | .107 | .096 | .103 |
| Tks lb. | ... | .101 | .093 | .101 | .086 | .097 |
| Menhaden, tks, Baltimore gal. | ... | .42 | .37 | .43 | .25 | .36 |
| Refined, alkali, drs lb. | .096 | .096 | .09 | .096 | .066 | .084 |
| Tks lb. | ... | .09 | .084 | .09 | .062 | .078 |
| Kettle bodied, drs lb. | ... | .106 | .10 | .106 | .08 | .096 |
| Light pressed, drs lb. | .09 | .091 | .084 | .091 | .06 | .078 |
| Tks lb. | ... | .084 | .078 | .084 | .056 | .072 |
| Neatsfoot, CT, 20°, bbls, NY lb. | ... | .18¼ | .17½ | .18¼ | .16 | .17 |
| Extra, bbls, NY lb. | ... | .13¾ | .13¼ | .13¾ | .08 | .12½ |
| Pure, bbls, NY lb. | ... | .14¼ | ... | .14¼ | .11½ | .12¾ |
| Oiticica, bbls lb. | .11½ | .12 | .11½ | .12 | .10 | .15½ |
| Oleo, No. 1, bbls, NY lb. | ... | .13⅜ | .13⅜ | .14½ | .09¼ | .14 |
| No. 2, bbls, NY lb. | ... | .12⅞ | .12⅞ | .14 | .08¾ | .13½ |
| Olive, denat, bbls, NY gal. | 1.60 | nom. | 1.60 | 1.65 | .73 | 1.60 |
| Edible, bbls, NY gal. | 2.50 | nom. | 2.20 | 2.50 | 1.60 | 2.25 |
| Foots, bbls, NY lb. | .12 | nom. | .11½ | .12½ | .08 | .10⅜ |
| Palm, Kernel, bulk lb. | ... | .07½ | .073 | .08⅛ | .04¾ | .083 |
| Niger, cks lb. | ... | .07 | .06¾ | .07¼ | .04 | .06½ |
| Sumatra, tks lb. | ... | .05¾ | .05¾ | .06½ | .03¾ | .06½ |
| Peanut, crude, bbls, NY lb. | .10¼ | nom. | .10¼ | .10⅝ | .08 | .10½ |
| Tks, f.o.b. mill lb. | .10⅛ | nom. | .10⅛ | .10¼ | .17¾ | .10⅜ |
| Refined, bbls, NY lb. | .13½ | nom. | ... | .13½ | .12 | .13¼ |
| Perilla, drs, NY lb. | .11½ | .11¾ | .11½ | .11¾ | .07 | .11¾ |
| Tks, Coast lb. | .11 | .11¼ | .11 | .11¼ | .066 | .11¼ |
| Pine, see Pine Oil, Chemical Section. | | | | | | |
| Rapeseed, blown, bbls, NY lb. | .13 | .13¼ | .13 | .13½ | .086 | .13½ |
| Denatured, drs, NY gal. | .89 | .90 | .85 | .90 | .52 | .85 |
| Red, Distilled, bbls lb. | .11⅝ | .12⅝ | .11⅝ | .12⅝ | .08⅝ | .11⅝ |
| Tks lb. | ... | .10¾ | ... | .10¾ | .07¾ | .09¼ |
| Salmon, Coast, 8000 gal tks gal. | ... | nom. | ... | nom. | .31 | .32½ |
| Sardine, Pac Coast, tks gal. | .54½ | .55 | .50 | .55 | .28 | .47 |
| Refined alkali, drs lb. | .096 | .097 | .09 | .097 | .066 | .084 |
| Tks lb. | ... | .09 | .084 | .09 | .062 | .078 |
| Light pressed, drs lb. | ... | .09 | .084 | .09 | .06 | .078 |
| Tks lb. | ... | .084 | .078 | .084 | .056 | .072 |
| Sesame, yellow, dom lb. | .13 | nom. | .13 | .13¼ | .12¾ | .14½ |
| White, dos lb. | .13 | nom. | .13 | .13¼ | .12¾ | .14½ |
| Soy Bean, crude Dom, tks, f.o.b. mills lb. | .10½ | nom. | ... | .10½ | .07 | .10½ |
| Crude, drs, NY lb. | ... | .11½ | ... | .11½ | .076 | .11½ |
| Ref'd, drs, NY lb. | .12 | .12½ | .12 | .12½ | .081 | .12½ |
| Tks lb. | .11½ | nom. | ... | .11½ | .07½ | .11½ |
| Sperm, 38° CT, bleached, bbls NY lb. | .10 | .102 | .10 | .102 | .094 | .102 |
| 45° CT, bleached, bbls, NY lb. | .093 | .095 | .093 | .095 | .087 | .095 |
| Stearic Acid, double pressed dist bgs lb. | .12½ | .13½ | .12½ | .13½ | .08½ | .12½ |
| Double pressed saponified bgs lb. | .12¾ | .13¼ | .12¾ | .13¾ | .09 | .12¾ |
| Triple pressed dist bgs lb. | .15½ | .16½ | .15½ | .16½ | .11¼ | .15½ |
| Stearine, Oleo, bbls lb. | .10¼ | .10½ | .10¼ | .11½ | .07¼ | .12¼ |
| Tallow City, extra loose lb. | ... | .09¼ | .08¾ | .09¼ | .04⅛ | .08¾ |
| Edible, tierces lb. | ... | .10¼ | ... | .10¼ | .06¾ | .09½ |
| Acidless, tks, NY lb. | ... | .13 | .12¾ | .12¾ | .07 | .11¾ |
| Turkey Red, single, bbls lb. | .08 | .08½ | .08 | .08½ | .08 | .08½ |
| Double, bbls lb. | .12½ | .13 | .12½ | .13 | .12½ | .13½ |
| Whale: Winter bleach, bbls, NY lb. | .105 | .107 | .091 | .107 | .072 | .087 |
| Refined, net, bbls, NY lb. | .101 | .103 | .087 | .103 | .068 | .083 |

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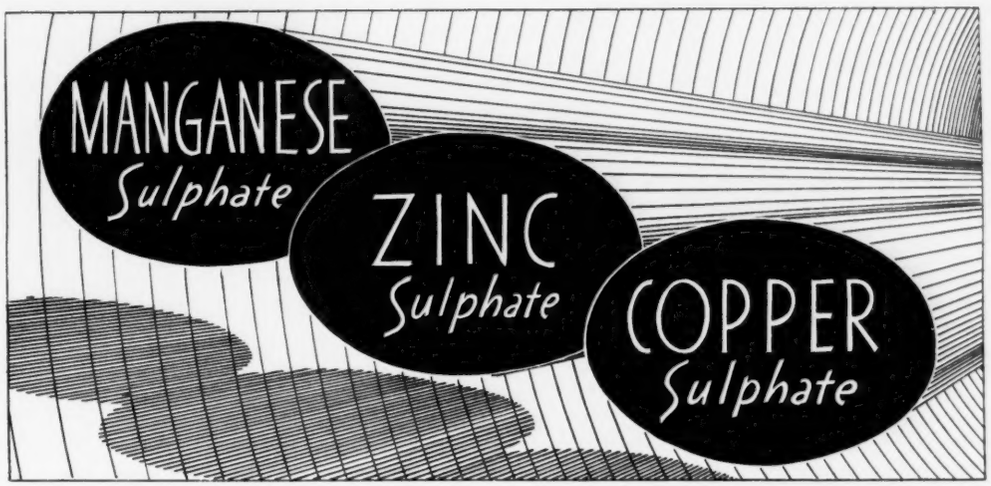


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PLANT MANAGER capable of taking full charge of a large or small chemical operation. Thoroughly experienced in the construction of plants, the erection of apparatus, and the details of operating technique and administration, seeks a responsible position with a small chemical or chemical specialty manufacturer, highest references as to ability and character. Box 1207, CHEMICAL INDUSTRIES.

## Help Wanted

CHEMIST WANTED: Well-known sulphonated oil manufacturer has an opportunity for a chemist possessing necessary experience and knowledge of mineral oils for lubrication, and emulsions for textile trade. Write stating age, education, experience and salary expected. Box 1221, CHEMICAL INDUSTRIES.

WANTED: Chemist interested in leather. State experience, salary expected. Box 1222, CHEMICAL INDUSTRIES.

## Business Opportunities

**CONSIDER THE CINCINNATI MARKET**

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CHEMIST, wide sales promotion and sales executive experience, seeks responsible position with reputable concern. Box 1224, CHEMICAL INDUSTRIES.

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## Business Opportunities

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WE ARE INTERESTED IN NEW PATENTED chemical products or processes which fall in the specialty or pharmaceutical field. Will purchase outright or on royalty basis items that have merit and meet our requirements. Submit full particulars in first letter. Box 1211, CHEMICAL INDUSTRIES.

IMPORTANT BELGIAN CHEMICAL MANUFACTURER is interested in new processes for manufacturing industrial chemicals on royalty basis. Can be contacted in New York. Write Box 1215, CHEMICAL INDUSTRIES.

## Wanted to Buy

WILL BUY CHEMICAL SPECIALTY process or business or manufacturing rights. Give details. Box 1210, CHEMICAL INDUSTRIES.

WANT TO BUY established chemical specialty business making products for industrial use. Prefer to take over complete but might take substantial interest with competent management remaining in control. Have cash and not interested in small or untried propositions. Box 1226, CHEMICAL INDUSTRIES.

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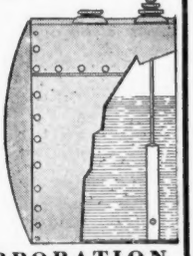

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# "We"—Editorially Speaking

Home town plant makes good is the theme of a four column story on Bakelite's Bound Brook operation in Plainfield (N. J.) *Courier-News* of March 5th —interesting and very accurate— congratulations all 'round.

❖❖❖❖

Foster Snell's house organ informs a panting world—or rather a smoking world —that cigarettes are flavored with chocolate, licorice, ginger, cinnamon, tonka, vanilla, molasses, rum, brandy, maple sugar, angelica, anise, juniper, cloves, honey, sugar, and organic esters. We never take anything but Coca-Cola ourselves; but we're sorry he forgot new mown hay, camel's hair, Bull Durham, and Mickey Mouse.

❖❖❖❖

Peter Dirr has broken his own record of twelve children. He was the long distance Daddy appearing in the new edition of the "Chemical Who's Who," but on February 26, since publication, he has become the father of another daughter. Huiskings really ought to open a Toronto office so as to enter him in the "stork derby."

❖❖❖❖

Bill Leach writes from Niagara Falls that the Mexican burro named "Franklin," which he brought back from his vacation last year and whose photograph appeared in our February issue, has developed a nasty kick. "In fact just after you give him a lump of sugar he is liable to take a nasty sideswipe at you. No gratitude in the darn critter. Guess they are all alike."

❖❖❖❖

We suggest to Mathieson's pet loving plant manager, that next winter he take his vacation in Siam and bring back a white elephant. At least they never forget.

❖❖❖❖

C. C. Concannon, the ubiquitous chief of the Commerce Department's Chemical Division, than whom there is no better friend to constructive chemurgic movements, has rendered another distinguished service to the growing tung oil industry by the establishment of a special information bulletin called the "Tung Oil Monthly." Like most government publications it is replete with figures, but unlike many, it is replete with interest too.

❖❖❖❖

Depreciation of the Dutch guilder is responsible for higher prices for imported dyes in the Netherlands, and the thrifty Hollanders are considering a revival of indigo cultivation in Java. Here's a new angle to the old land vs. laboratory battle. It indicates just how topsy-turvy our present-day political economics have become.

❖❖❖❖

The *New York Enquirer* must have a Walter Winchell tucked away somewhere in the chemical industry, for they certainly have the "low down" on Eli Winkler, Bill Mueller, Steve Kelly, and Lou Neuberg, and, of course, they know all about Doc Dorland's Mexican jaunt, and they almost never fail to mention John A. Chew, Esq.

❖❖❖❖

Our Book Department had a brilliant idea: "big name" testimonials that would be most effective advertising for the new edition of the "Chemical Who's Who." So they sent out some inquiries with the following results:

**John A. Chew**—"I note that "Doc" Dorland's biography takes up nineteen lines, that's a lot of space for that big fish."

**Ralph E. Dorland**—"Fourteen lines is altogether a waste of space for that little shrimp, Johnny Chew."

**Pierre F. du Pont**—"In accordance with the provisions of the Patman law, I do not care to be quoted."

**Hon. R. F. Wagner**—"I assure you that I shall be glad to study this matter carefully when and if, it is reported on the floor of the Senate. It is always a pleasure to serve my constituents."

**H. L. Derby**—"Except for our own salesmen's reports the "Chemical Who's Who" is the best reading of 1937."

**Herbert Hoover**—"I always said things were going to improve, and the "Chemical Who's Who" proves it."

**D. D. Berolzheimer**—"The new edition is lousy. What you need are the services of a first-class, expert chemical bibliographer."

**Metro-Goldwyn-Mayer** (by wireless) "Chemical Who's Who is colossal success, packed with breath-taking human interest. Offer two million for scenario rights."

❖❖❖❖

We learn from the latest P. & G. advertising campaign that "knotted nerves" can be relieved by a daily bath with Ivory Soap. Perhaps after all these advertising slogan "fellers" who succeed in curing us of "B. O.," bad breath, super-acidity, etc., *ad infinitum, ad nauseam,* may have a germ of an idea for the harassed tax-payer. One subscription free to the best slogan maker and C. I. employees are not barred. What's the use of being logical in this day and age!

### *Fifteen Years Ago*

*From our issues of April, 1922*

**A. B. Houghton, Corning Glass, presented with American flag and testimonial booklet by his employees on his departure for Berlin as ambassador to Germany.**

**DuPont sells historic powder plant at Brandywine, founded in 1802 by Eleuthere Irenee du Pont, to make way for encroaching residential district.**

**John F. Queeny completes fifty years' service in the chemical industry.**

**C. A Mace, formerly with Ciba, joins Butterworth-Judson.**

**National Aniline and General Chemical move their New York offices to 40 Rector St.**

**Commonwealth Chemical (benzoate of soda) absorbed by Mathieson Alkali.**

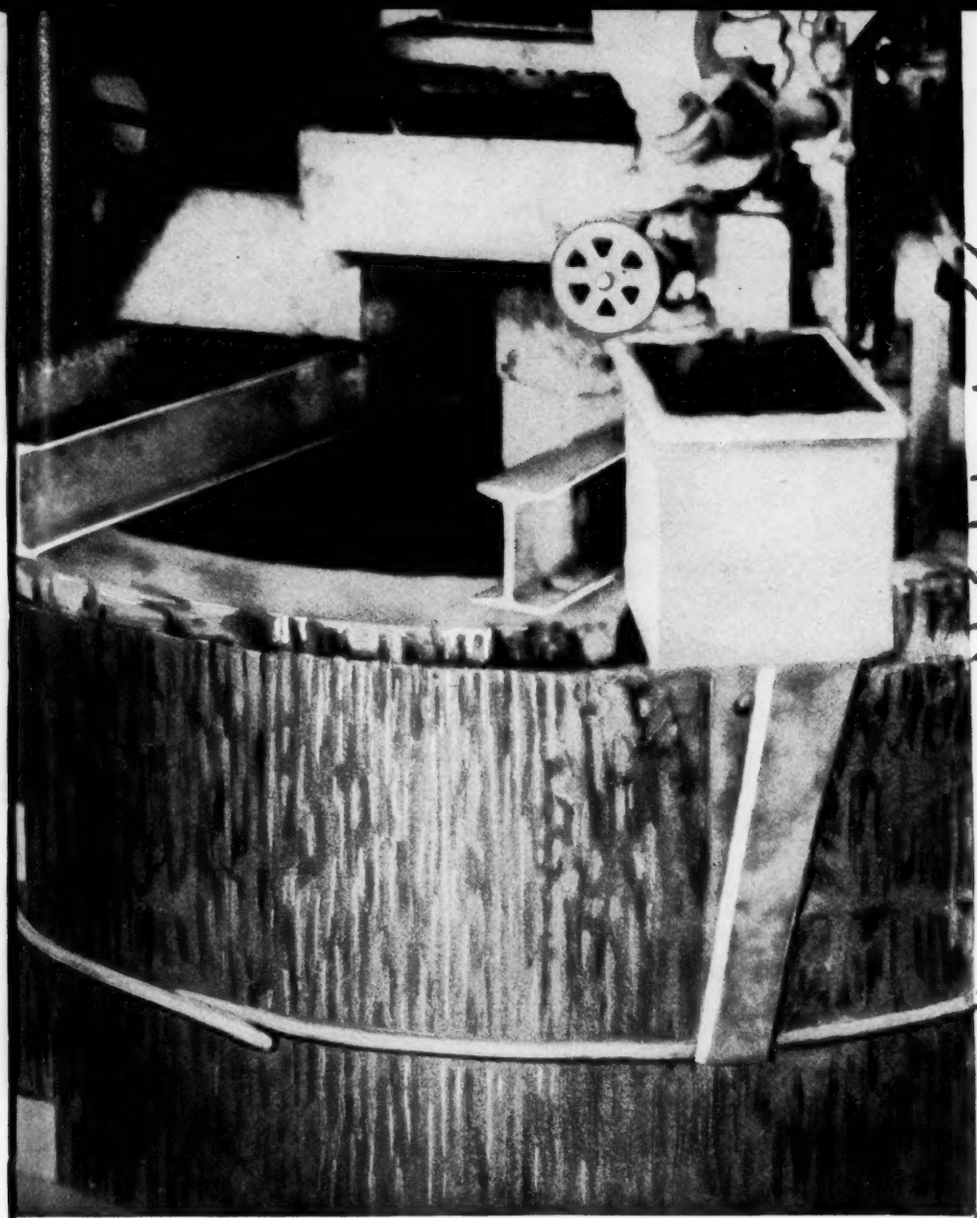
**Clarence Morgan forms firm of Clarence Morgan & Co., taking over Chicago stock of Rockhill & Vietor.**

**California Spray Chemical, Watsonville, Cal., increases capital stock from $50,000 to $350,000.**

**Bonn & Co. acquires rights to work Casale ammonia process in this country.**

**Chemical Salesman's Ass'n unanimously endorses American valuation as the basis for chemical and dye tariff rates.**

**J. S. Cook, formerly Rockhill & Vietor, joins dyestuff department of Wm. S. Gray & Co.**



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